BBC · MASTER · ELECTRON · A3000 · ARCHIMEDES FEBRUARY 1990 £1·50

BBC ACORN USER



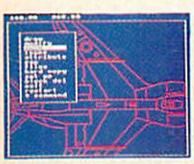
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EDUCATION
Key software for geography in the classroom



TAKE UP ARMS
the ultimate upgrade for more Arc speed



REVIEWS
Beeb design, A3000 add-ons, Arc graphs and sound



1989/90 AWARDS
the best on Beeb and Arc

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the ability to store *information* and *access it* at the touch of a button.

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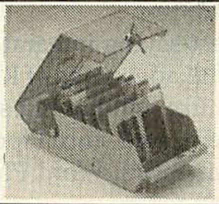
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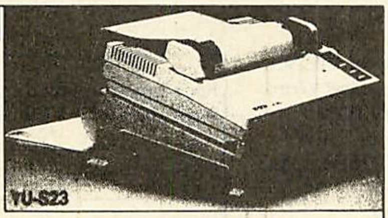
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Made of molded plastic. Feeds and refolds paper underneath the printer, takes up hardly more space than the printer itself
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Securely holds any printers wide or small. Made of molded plastic. **£10.50**

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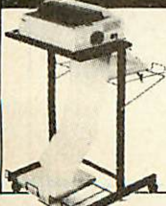


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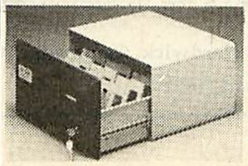
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BBC ACORN USER

FEBRUARY 1990 ISSUE NO 91

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BBC ACORN USER AWARDS



Cover photograph by John Barlow

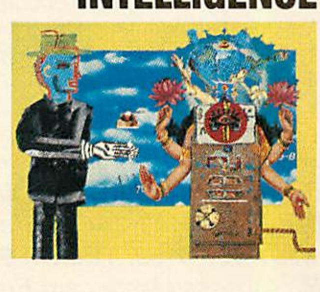
74
PERFECT TIMING



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TRIANGULATION



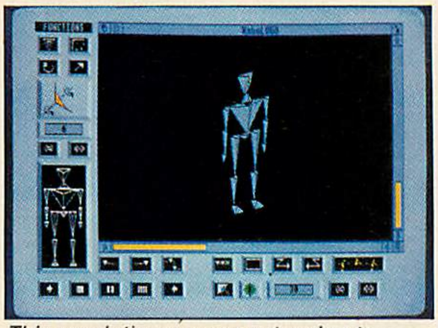
78
USING YOUR INTELLIGENCE



SILICON VISION

SOFTWARE FOR THE ARCHIMEDES COMPUTER SYSTEM

RoboLOGO



This revolutionary new extension to traditional LOGO, made possible only by the enormous computational power of the Archimedes, provides three dimensional control of an articulated humanoid or animal figure through the use of a standard LOGO language. Sophisticated natural commands such as 'Walking', 'Turning', 'Bowing', and 'Picking', etc are automatically represented graphically by natural movements of the 3D figure. This natural form of graphical response is readily understood by students using LOGO to learn the concepts of logic & reasoning. The traditional Turtlegraphics & 3D Glider features are also supported for easy transition to this innovative concept in natural response LOGO.

£69.95 (ARC) New

Realtime Solids Modeller

The package includes both the sophisticated design environment of SolidCAD and the high speed capability of a Realtime Graphics Language module to provide the fastest programmable animation facilities bringing any design to life from within your own programs. Facilities include 3D Rotate, Scale, Orbit, Perspective, Position & extensive display styles for wireframes, hidden-surface removal, smooth shading and multiple light sources with individual intensities.

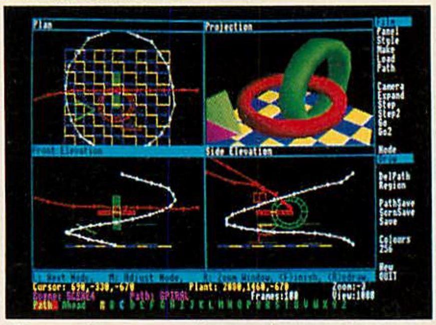
£149.95 (ARC) New

Gate Array Design System

An introductory course for teaching Silicon Chip Design with facilities for Array design, Cell design, On-line Help and a tutorial on integrated circuit design. Ideal as a low cost teaching tool where expensive silicon fabrication facilities are not required.

£89.95 (ARC) New

FILM-Maker



The package provides an interactive environment to create animated sequences of 3D scenes with dynamic camera motion for 'walk-throughs' and 'flight-paths' for objects within the scene. The fully graphical environment requires no programming or textual entry and the capability to calculate smooth shaded frames of complex scenes with lighting effects at very high speeds allows fast interactive design of animated sequences. A large number of these frames can then be stored using built-in compression facilities to play-back at flicker-free rates for on-screen animation or video recording. Fully compatible with SolidCAD and SolidsRENDER, animation Oscars are now within your reach.

£79.95 (ARC) New

SolidCAD

The next generation multi-tasking CAD package combining 2D Draughting and 3D Modelling techniques with advanced smooth shading and lighting effects to provide the ultimate 3D Draughting System for Architectural design, Interior design, Engineering design and Teaching CDT. Allows drawing in plan, front & side elevations and also directly in 3D to visualise a model while it is being created. Powerful zoom, pan, sweep, extrude and macro facilities are also provided to enhance design productivity.

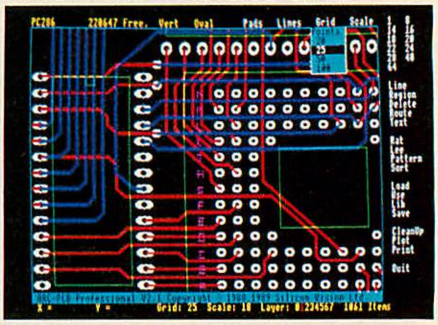
£99.95 (ARC) New

SolidTOOLS

The fully integrated environment for 3D CAD, Animation, Rendering & Hardcopy. The package includes SolidCAD, FILM-Maker, SolidsRENDER, Realtime Graphics Language, SuperDump & SuperPlot for a turnkey solution satisfying all your requirements.

£275.00 (ARC) New

ARC-PCB Professional



The ultimate PCB design package developed specifically for the Archimedes is now even better. ARC-PCB Professional follows on the success of the original and provides Faster & Improved Automatic Routing, Oval & Circular pads with fully variable sizes, Faster Redraw, Extended library part manipulation, & Instant Editing operations for substantially increased productivity. This Professional version operates orders of magnitude faster than the original and surpasses all other PC-based PCB design systems in features & speed of operation for the fastest turnaround from concept to finished board design. Take the lead for your PCB designs before your competitors do.

£375.00 (ARC) New

SolidsRENDER

The fastest most advanced Ray Tracing package for the Archimedes producing photo-realistic images of SolidCAD designs or FILM-Maker animations which take into account light sources, reflections, shadows, transparencies, refractions and textures for the highest quality pictures from the leading 3D graphics experts renowned for technical excellence.

£79.95 (ARC) New

RiscBASIC

The best BASIC V compiler money can buy. Here's what the reviewers say:
"If you are looking for THE compiler to go for, and are confused about which one deserves to win the very public battle that has been raging in the advertisements, well my preference is for RiscBASIC" - RISC USER Aug 1989.
"In summary, BASIC V is the best version of BASIC produced and RiscBASIC provides the most compatible, fastest compiler for this language. My congratulations to Silicon Vision" - Archive June 1989.
"RiscBASIC wins the race...has the edge overall" - BBC Acorn User Nov 1989.
"very useful indeed for development work...produced significantly more efficient code" - Micro User July 1989.

£99.95 (ARC) New

All software run in native mode on A300-400 Series & A3000 with RISC OS. Enquire for our free product Catalogue

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MACH LOSSES ACCOUNTED FOR

A liquidator has been appointed for Cleveland based Mach Technology which went bust in November.

At the creditors meeting held at the office of Mach Technology's accountants J B Taylor & Co on December 5th, John Taylor was appointed liquidtor.

According to Taylor only one creditors' representative turned up and, due to the lack of creditors attending, a committe of inspection has not been ordered at this time.

An assesment of Mach Technology's assets has been made which reveals the company has assets £6000 - mostly fixtures and fittings.

However, according to Taylor the realistic resaleable value at auction is in the region of £1600. 'That's just enough to wrap up the cost of liquidation' said Taylor.

In all, unsecured creditors such as magazines which carried advertisments for Mach Technology have lost £22,643. Even though a number of uncashed cheques have been returned, customers have lost a total of £28,633.

CHEAP WORKSTATION

Acorn has entered the Unix workstation price battle by announcing a discount offer on a complete R140 system.

At £2999 plus VAT Acorn is bundling an R140 workstation with hard disc and Ethernet networking, plus a choice of either PC emulator software and a 14in Taxan colour monitor, or a 19in Taxan Viking monochrome monitor.

The offer which is aimed particularly at education will be reviewed in the new year. Acorn is on (0223) 245200.

NEW R & D DIRECTOR FOR ACORN

Acorn has strengthened its technical management team with the appointment of Malcolm Bird to the post of research and technical director.

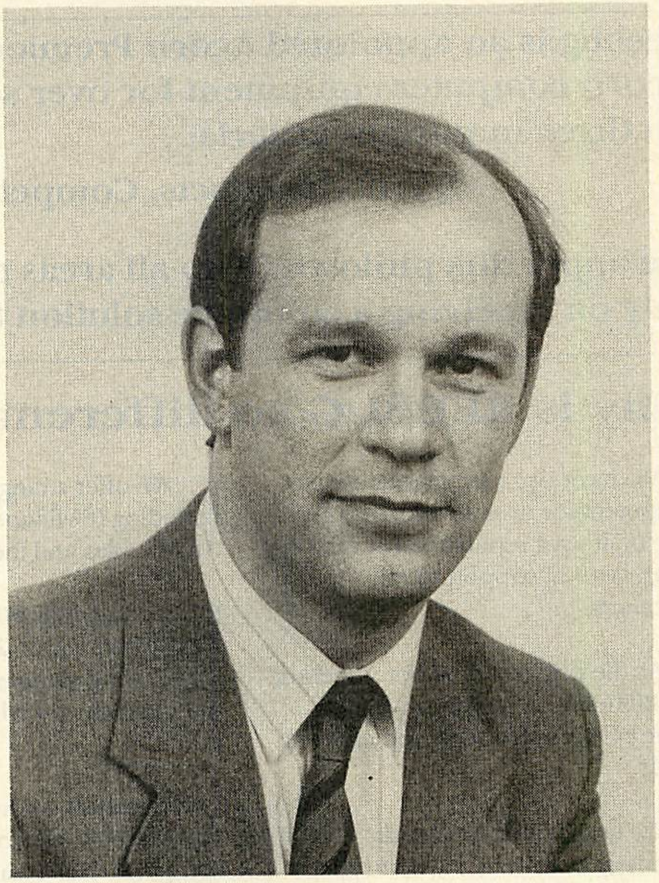
Bird's responsibilities in his new role include the formulation of future development strategy for Acorn's Risc technology as used in the Archimedes range as well as the company Unix workstations.

Bird will also be directing advanced research carried out by systems software teams and hardware design groups.

When asked about his new role, Bird told *BAU* that he would be looking at what products Acorn should have for the future. 'We have to look ahead a good number of years at developments such as chip design', he said.

Of Acorn's Arm chip Bird said 'it fills a gap in the market where price/performance counts but we are not restricting ourselves to Risc technology alone.'

Bird reports directly to Acorn's managing director Harvey Coleman.



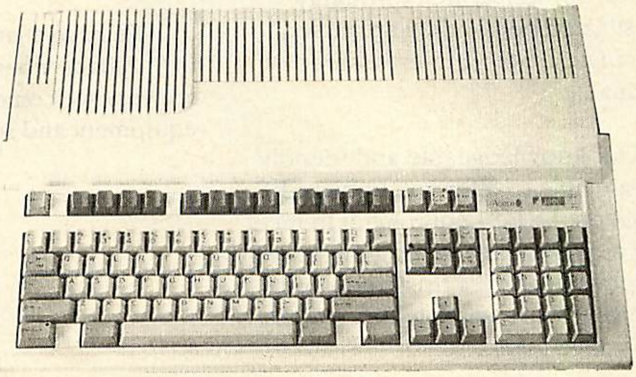
MORE OUTLETS FOR THE A3000

Acorn Computers has increased its number of high street outlets for the BBC A3000, following agreements with John Lewis and Alders.

Priced at £649 excluding VAT, the BBC A3000 is now being sold in 10 leading John Lewis Partnership stores and four Alders stores throughout the country.

The A3000 has already been sold through Dixons flagship stores since September and the addition of 14 high-street outlets reconfirms Acorn's commitment to selling the A3000 as a serious hobbyist's machine.

Terry Shurwood, General sales manager at Acorn said 'the agreements with John Lewis and Alders will further enhance the A3000's high-street visibility and incease sales.'



Editor Geoff Bains. **Assistant Editor** Pauline McLernon. **Technical Editor** Robert Miller. **Editorial Assistant** Christina Neal. **News** David Janda. **Production Assistant** Julia Woods. **Art Editor** Adam Hayes. **Ad Manager** Roger Mullins. **Sales Executives** Richard Power, Duncan Pringle. **Ad Production** David Noakes, Liz Walsh. **Production Manager** Jennifer Jeffrey. **Managing Director** Ellen Brush. **Publisher** Seamus Geoghegan. **Publishing Director** Michael Potter. **Editorial Director** Chrisopher Ward.

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As the publishers of both Beebug and RISC User magazines we are aware of the latest developments and trends.

We listen carefully to our customers and stock the items that they require. Because we have confidence in our product range we buy large quantities and therefore can pass the discounts on.

New products are thoroughly investigated before they are added to our range so you can rest assured of the quality.

Our knowledgeable and friendly staff are able to offer you unbiased advice on the best equipment to meet your requirements. Buying the wrong equipment can be a frustrating and expensive experience which we can help you to avoid.

We offer a range of credit facilities including 0% finance on all Archimedes and the Master 128.

On average over 80% of orders are dispatched within 24 hours of the order being received and if the item is out of stock you will be immediately notified.

All orders are now keyed directly into our new networked mail order computer. This ensures that your order will be processed efficiently and speedily, and enables us to instantly give you up to date information should you have a query about your order.

We have a large showroom based in St Albans where personal visitors are very welcome to try out the latest equipment and software.

After you have made a purchase from Beebug, we do not lose interest. If you have a query on a purchase you can phone our technical hotline and speak to one of our technical advisors who will do their best to help you.

In the unlikely event that an item develops a fault we have our own engineering department, with a speedy turnaround.

Beebug is the only dealer to offer FREE On-Site Maintenance on all Archimedes computers sold in the UK.

Call 0727 40303 and ask for a copy of our FREE information pack. This includes a copy of our new 40 page retail catalogue and details about the Beebug and RISC User Magazines. Alternatively, write to the address below.

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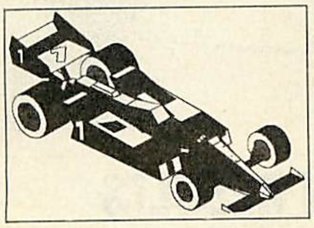
EUCLID UPDATES

Ace Computing has launched *Archlight,* a ray tracing package for users of *Euclid,* their 3D Arc graphics package.

The package uses ray tracing to produce realistic 3D pictures. *Archlight* can ray trace all existing *Euclid* pictures.

Ace Computing is on (0223) 322559.

● Elements, the independent *Euclid* user group has produced its first quarterly disc of pictures, hints and tips.

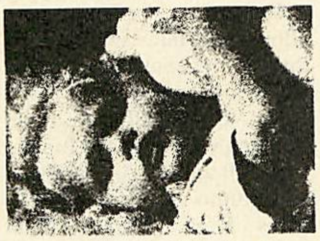


MAC DRIVER

Watford based Point Technologies has developed a printer driver program for use with an Epson FX-80 or compatible 9-pin printer connected to the BBC micro.

The program is designed for Beeb users with Apple Macs who wish to save on the cost of purchasing a costly Mac serial card and Imagewriter printer.

The Macintosh connects to the Beeb serial port which saves



the cost involved in buying a serial card for the printer. The program running on the BBC micro interprets Imagewriter LQ control codes from the Mac and translates them into Epson control codes for the printer.

The driver software costs £30 and more information can be obtained from Point Technology at Unit 9, 101 Grandfield Avenue, Watford WD1 3XD.

ARC POP PROMO



Hardware, a newley formed computer graphics company from London, has produced a pop promo generated with the aid of an Archimedes.

The video for 'Cold Cuts Christmas Break' by DJ/mixers Cold Cut was made to broadcast standards using an Archimedes as well as an Amiga and an Apple Mac IIcx.

The video is a mixture of two and three dimensional animation, randomly generated backgrounds and animated digitizations. It features Cold Cut collaborators Yazz and Lisa Stansfield, with cameo roles in a computerized nativity play.

Hardware is on 01-737 0792.

SAFE PROJECTOR

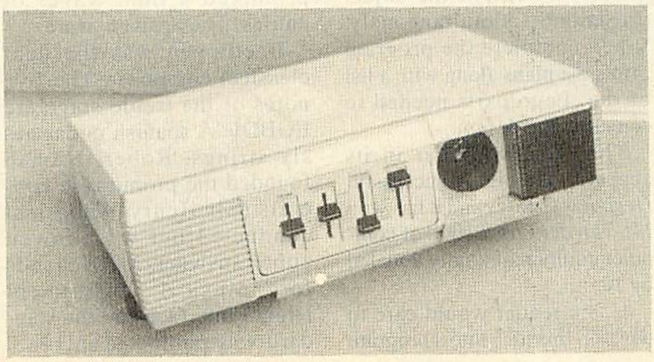
A new LCD based colour projector capable of showing screens from a variety of video sources including computers is being distributed by Huntingdon based Solitar Ltd.

The Epson colour video projector can take video input from a computer, camera, VCR and laser disc player and is capable of 'multi-tasking' up to three input devices at a time.

The projector should find favour in education with its low price, small size and easy set up. It is a single lens device and this negates the need to align red, green and blue lenses.

Because the projector is based on LCD technology which reduces screen flicker, it can be viewed safely by persons suffering from epilepsy. Conventional projectors can bring on an attack.

The projector costs £2995 plus VAT. More details from Solitar on (0480) 67945.



FUN ON THE ARC



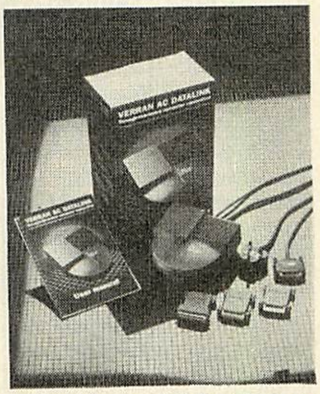
Database Educational Software has released its sucessful Fun School 2 title for the Archimedes.

The product which has already sold over 60,000 copies in other formats has been rewritten to make use of the facilities available on the Arc by including both digitized pictures and sound.

For more information contact Database Software on (0625) 878888.

MAINS CONTROL

Verran Electronics has developed a method of connecting any type of computer or peripheral via the mains.



The Verran AC Datalink is, in effect an intelligent mains plug. One is plugged into each terminal or peripheral required to be linked. Data is sent through the mains cable in packets containing control information and data bytes.

Datalinks cost £175 each and are supplied with leads, adaptors, manual and warrenty.

For more imformation contact Infopress on 01-353 2320.

NEWS IN BRIEF

● Phobox Electronics has released measurement and datalogging software for the Arc to gather data from the Mesu-Sac interface box or the analogue port, plot or list it on screen and file it in a variety of formats. Price around £20. Phobox is on (0305) 853767.

● Owners of modems without built-in MNP error correction can upgrade them with the error correction unit from Inmac.

At £119 the unit draws its power from the RS232/423 interface and is transparent in operation. Inmac is on (0345) 45555.

● Crown Computer Products has reduced the price of the Sharp JX 930 laser printer from £1595 to £799! The printer features 6PPM throughput with 300x300DPI resolution and four standard fonts. Crown is on (0704) 895815.

● Clares Micro Supplies is selling the Hewlet Packard Paintjet colour inkjet printer to educational establishments for £645 plus VAT. Non education users can also order the printer at the discounted price of £795 plus VAT.

The company is also selling a range of HP Paintjet consumables. Clares is on (0606) 485111.

DIARY DATES

17-20 January. BETT 90, The Barbican, London. Contact: EMAP Exhibitions, on 01-404 4844.

20-22 March. The Seventh International Conference on Technology and Education, Brussels, Belgium. Contact: CEP Consultants on 031-557 2478.

25-28 September. Business Computing 90, Earls Court Exhibition Centre, London. Business and trade exhibition only. Contact: Montbuild on 01-486 1951.

ACORN CHARITY ARCADE



Cambridge shoppers were given the chance to play computer games for charity when employees of Acorn joined forces with the annual *Children in Need* appeal.

The company set up an arcade of 15 BBC A3000s and for 50 pence players could choose from a number of games with a chance to win an A3000 for the highest score.

Michael Page, Corporate Communications Manager at Acorn later said 'The Arcade proved to be a most sucessful way of raising money for such a worthwhile cause.'

BBC ACORN USER COMPETITION RESULTS

The judges of the readers survey competition back in the May 1989 issue have finally made up their minds. The competition was for the best suggestion for an article or program for *BBC Acorn User.*

We received thousands of completed survey forms with hundreds of different ideas for articles. Some were brilliant, some we've already done, some impractical and some downright silly!

After much deliberation we selected as the best a suggestion for a program from J F van der Post from Holland. His idea was for a program to design models made from Lego.

The model is designed on screen from correctly shaped, sized and coloured blocks with different views of the object presented simultaneously. When complete the program prints the plans along with a list of the Lego parts needed to construct the design.

The idea is similar in its appeal to the highly successful *Designer Castles* and it has won Mr. van der Post £1000 of computer equipment kindly donated by Acorn.

If any reader would care to develop this idea into a program we would be most pleased to publish it in *BBC Acorn User.*

Some other good ideas are worthy of a mention too. Mr. A Mitchell from Sunderland suggested an article explaining the principles of designing a cardboard box and a program for producing the shape needed to fold into a box of the required dimensions.

Mike Kerr of Bangor suggested a home weather forcasting program, possibly based on an expert system, and Alan Gibson from Kirkldy rather irreverantly suggested a series entitled 'Whatever happened to...' on all the hardware and software that companies promise but never deliver!

● The music competition in the October 1989 issue also prompted a tidal waves of entries. The answers were:

Beethoven was the deaf classical composer. The five notes of the treble stave are EGBDF. A spanish guitar has six strings. Robert Numan founded the promonade concerts (Sir Henry Wood just conducted but we allowed either answer). MIDI stands for Musical Instrument Digital Interface and the standard was published in 1983. Vince Clarke was the Beeb MIDI man in *BAU*. There are 12 semitones in an octave and the ex-programmer Declan McManus is Elvis Costello.

That just leaves the inventor of the electric guitar. Tricky one this as no sources seem to agree. Lloyd Loar is credited with being the inventor of the electro-acoustic guitar. Adolf Rickenbacker, the electric pickup (on a steel guitar) and Les Paul, the modern solid body electric guitar.

Being in a good mood we allowed all three and the first three correct entries out of the Editor's stetson were:

Mr. G. B. Sharpe from Reading who wins the Roland CM-32P and an Arc interface and Studio 24 Plus software, Miss K.M. Wright from Basildon, Essex who wins the Casio HT-3000 and EMR's Beeb MIDI interface and *Miditrack* software and Richard Hartley from Sheffield who wins the Casio CSM-1 and a Beeb system.

There were also winners of 10 EMR *Symphony* discs and of 10 EMR MIDI books. Congratulations to the winners and our thanks to everyone who entered.

APPOINTMENTS

Acorn Computers Ltd. is already established worldwide with its high performance quality computer systems and is the only company in Europe to have developed its own RISC processor. We are constantly striving to improve existing products and have an impressive development programme for new products and new markets. As an Acorn user you may have the skills we need to ensure that our programme stays on course.

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Ref AU/AC/017

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Ref AU/ARW/018

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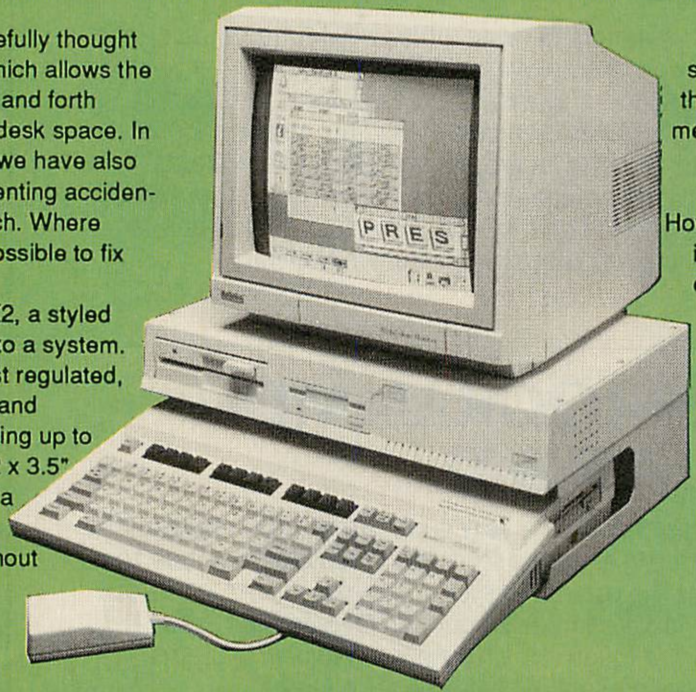
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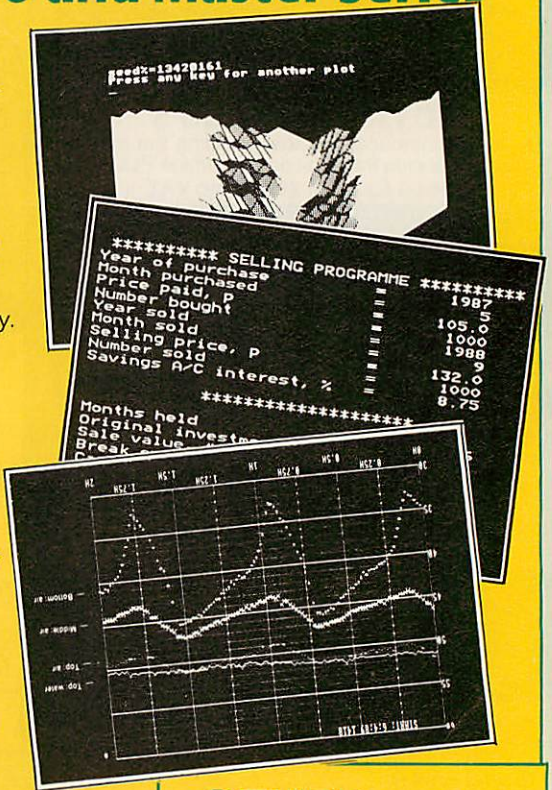
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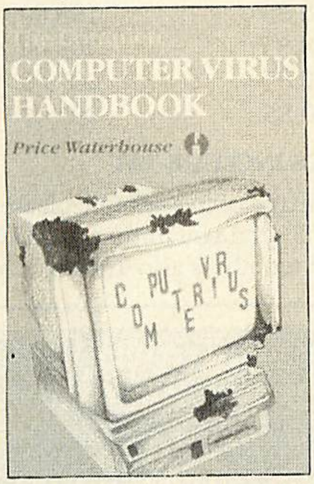
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A VIRUS WARNING

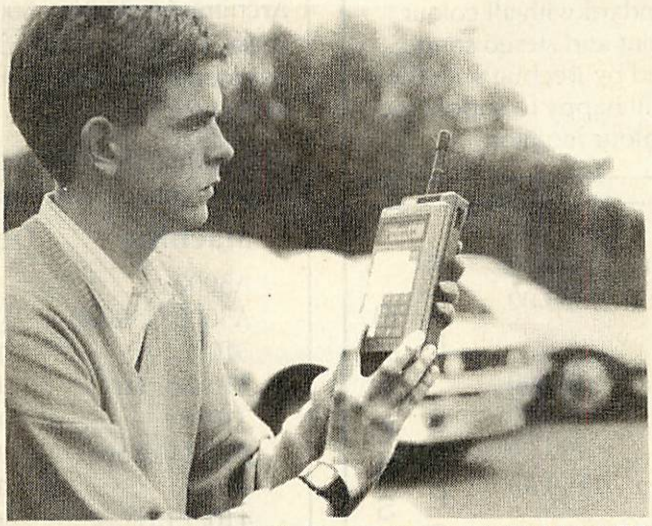
Computer viruses are very much the topic of the day at the moment. The question is; do we Acorn users have anything to worry about? The answer is both yes and no.

First, both Master 128 and Archimedes users who use the PC emulator could be affected by a virus which is written for PCs. Secondly, both the BBC micro and the Arc could be at risk. There is a degree of complaceny among Arc owners as Risc OS is held in Rom, and as a result that much harder to fiddle about with. However, more and more modules are resident on disc, for example the font manager.



Take the BBC micro. OS completely on Rom, no battery backed Ram (as standard) in which to hide code in and a simple directory structure. Yet it is relatively easy to write a Trojan which trashes a file entry at random with the user having little knowledge of what's happened and from where the culprit originated - I know, I've written one!

The other point worth bearing in mind is distribution: All infection relies on a medium. The common cold is carried on air, and the most effective medium for computer viruses are computer networks.



Got yourself a radio controlled broom-broom this Christmas did we? Well here's some kit that will make you go green with envy. Datafon from ANT Telecommunications is billed as a radio data capture and transfer device, but they're not fooling me! Oh no, I know a large-scale radio control Tonka toy when I see one, but dammit, batteries not included.

The *Complete Computer Virus Handbook* by the Price Waterhouse security devision is a misnomer in that there is no such thing as complete anything. However, its a fascinating insight into what a virus is, how they work and how to deal with them. At £15 it's a little expensive but worth it all the same. Pitman Publishing is on 01-379 7383.

MINITEL

The French computerised information system Minitel was an expensive service to access, what with a phone call costing 46p per minute to France. I say 'was' as Aldoda International has put an end to all that.

The company has set up a network in the UK which enables people who subscribe to Minitel via Aldoda to access the entire range of Minitel services at a much reduced rate. What's more, Aldoda has produced Minitel software for the BBC micro. For an information pack call Aldoda on 01-586 5686.

SPEAK SPANISH

Tecla 2000 is a Spanish language database run by the language centre at Birkbeck College. Run on the Prestel viewdata system, it's aimed at people with a basic knowledge of Spanish but who would like to get to know more.

The database consists of a set of news stories, current affairs, items of cultural interest and so on. The main stories are accompanied by a set of vocabulary pages and notes providing background information learners might not know. To access Tecla key *TECLA#2000 when on Prestel.

David Janda

If you have any comms news please sent it to David Janda at BBC Acorn User *or contact him on Telecom Gold 81: RED001 or via Prestel 919992492.*

NEWS IN BRIEF

● Yet another bulletin board has sprung up for Beeb users. This one is based in Leeds on (0532) 661536. Accessible at 300/300 and 1200/75 baud it's run by Chris Royle who would appreciate a call.

● Having problems with local area micro to micro communications? Could it be that your RS423 cable is too long for the standard in which case you'll be interested in the Action Computer Supplies RS232 line driver. Bung two of them at each end of the link and you can talk to another terminal 1250 meters away! ACS is on (0880) 33 33.

● A new viewdata board run on Communitel software has come to my attention . Based in Crawley on (03420 712 148.

● The problem with some sysops is they operate their board on a part-time basis and wonder why people phone out of hours. The answer is simple. The one item of information that is going to be lost on the grapevine is the time the board is open. So, if you do intend to run a BB try and get a dedicated line.

That said, I will plug Cyclone based in Norwich on (0603) 868357. It operates 6-10pm on ringback (call once, hang up and call again) and direct connect 10pm to midnight.

● Hayes which is infamous for the 'AT' command set has managed to get a favourable court ruling in the states. A lot of modem manufacturers are claiming to produce 'Hayes compatible' modems.

Hayes is getting somewhat sick and tired of these chaps. So if you intend to manufacture a Hayes compatible modem, do make sure you get a licence from Hayes to do so!

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THE LAST RESOURCE

The banner 'Information Technology Across the National Curriculum' pulled in the punters to the Resource conference, held at Doncaster Racecourse in mid-November.

Over 800 delegates came to listen to luminaries such as Richard Dorrance of the National Curriculum Council, Ralph Tabberer of NCET and Lady Parkes, chair of the Design and Technology Working Party.

However, with four lecture programmes running simultaneously, including a strand devoted solely to IT and music, the less prestigious speakers were actually more interesting.

In fact most interesting of all was the exhibition, which has grown over the years until just about every company in the market is represented, making Resource the undoubted northern rival to BETT.

Resource used the event to launch the Resource Controller, a connectivity product which allows existing BBC micro peripherals such as Concept Keyboards, control technology devices and data logging equipment to be used with the Apple Macintosh.

The Controller has a wide range of functions built into its operating system and communicates with the Macintosh via the machines, serial ports.

The price to education, including manual and support software, is 170. Contact Resource, Exeter Road, Off Coventry Grove, Doncaster, DN2 4PY.



Acorn makes its stand at the Resource exhibition, companion event of the Resource conference which took place at the Racecourse in Doncaster in November

DTI AWARENESS

The DTI is sponsoring three two-day exhibitions of educational software but is adamant that there will be no software offer in the current academic year. Any future DTI software scheme is likely to be restricted to specific work-related areas of design and technology.

The exhibitions are being organised by ESPA, the Educational Software Publishers' Association. It approached the DTI claiming that although schools have been provided with equipment for, say, design and technology, with the changes in the curriculum, they need opportunities to evaluate software as well.

In response the DTI agreed to sponsor a campaign to make teachers more aware of appropriate educational materials.

It is hoped that the exhibition will be a precursor to a software evaluation purchase scheme.

The venues for the exhibitions are Edgbaston Centre, Birmingham (14-15 February), Queen Elizabeth Hall, Civic Centre, Oldham (13-14 March) and North Avon Teachers' Centre, Winterbourne, Bristol (26-27 March). Entrance is free to teachers and advisory staff.

LMS LAG

Surprise, surprise, the Government's local management of schools legislation is proving to be something of a headache. According to a recent survey, 23 percent of LEAs have no plans for the LMS at all and 56 percent have opted to take the maximum three years for implementation. Only eight percent of LEAs will have systems running within a year.

The survey was conducted by Capita Systems, a management consultancy specialising in the public sector. Capita director Linus Parker commented, 'The survey revealed that a number of LEAs are compeletely unprepared for the consequences of the new legislation.

'In some cases it was unclear who the LMS manager actually was within the authority and it appears that few, if any, of the LEAs have the resources available to cope with LMS.'

He went on to remark that even those authorities with well progressed plans are likely to experience huge problems as more schools are phased in over the next few years.

'LEAs are also going to have to provide skilled training units, either in-house or through external contractors, to cope with the new systems and its demands,' he concluded. Did we need a survey to tell us this?

Lisa Hughes

NEWS IN BRIEF

● ***Firewise*** **is a new fire prevention and education program developed by the Home Office with Bedfordshire Fire Service, LEA and junior schools.**

It consists of a guide, nine project sheets, a map of a fictional town and computer database which provides a 'log' of 240 fires.

Copies of ***Firewise*** **are free from Fire Prevention Literature, COI Stores, 184 Shepherds Bush Road, London W6 7MP.**

● ***The Railway Drama,*** **new from Fernleaf Educational Software, tells the story of a Victorian branch line. It provides opportunities for cross-curricular work on geography and social and economic history.**

Targetted at the 10-14 agegroup, it costs £39.95 and is available for the BBC B, Master and Compact. An A3000 version is in preparation. Fernleaf is at 31 Old Road West, Gravesend, Kent, DA11.

● **The sixth edition of the** ***Datafile of Educational Software and Addresses*** **is now available. It runs to 4370 software titles and over 1000 revelant addresses.**

The combined listing cost £20, £12 for just one. ***Key*** **and** ***Viewstore*** **versions for all Acorn machines are available from Nick Evans, PO Box 55, Grimsby DN32 QB.**

● ***Computing - Your Career*** **will be a useful addition to any school's careers library. Published by the Federation of Recruitment and Employment Services, it aims to give students an idea of the qualifications and attributes required for a career in computing.**

It costs £11.20 (cheques payable to FRES Ltd) from Ampercord, 19-21 Great Portland Street, London W1N 5DB.

GET YOUR FREE SAMPLES

With so many samplers available now for the Archimedes, I thought it would be a good idea to pass on a few tips about taking good samples.

First of all, use a good quality audio lead to connect your sampler to your synth, tape recorder, CD or whatever.

Beware of running the cable across your monitor, over the computer or on top of any electrical equipment, as this may introduce noise into the sample.

Check for this by taking a sample with nothing plugged into the sampler. Any signal you capture will be a product of the sampler's own circuitry. Hopefully it will be minimal.

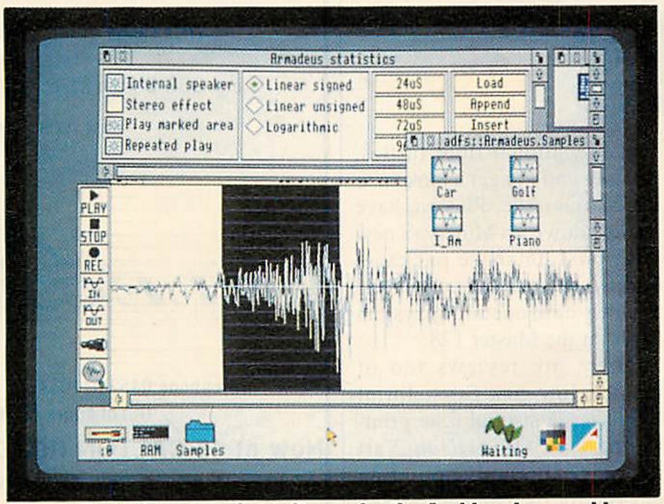
Next plug into the sample source, set the levels and take a sample but don't actually play anything. That will tell you if the source itself is introducing noise into the system.

Some samplers have both mic and line input sockets. So which do you use? Microphones produce a lower level signal than, say, a synthesiser or tape recorder and mic inputs are therefore generally more sensitive.

However, if you record a synth through the mic input you may find it too sensitive. Instruments generally sample better through a line input.

The idea is to get as much signal into the sampler as possible without clipping or distorion – much the same as making a good audio tape recording.

Most samplers have a moving waveform display which indicates the level of the incoming signal, allowing you to set the optimum input level. If a signal is clipping or distorting, the waveform will bang off the top and bottom of the display. If you sample at that level, the sampled waveform will probably show flattened waves and you will be able to hear the distortion on playback.



Claves' Armadeus sampler software for the Archimedes provides almost endless possibilities for sound manipulation

A useful software option is the ability to set a trigger or threshold level. This is useful if you need to be away from the computer to trigger the sound or if you aren't exactly sure when the sound is going to begin (you may be trying to sample your dog's bark).

If the trigger level is too high, you will lose the beginning of the sample and may get a nasty click in its place. If you are sampling a quiet sound or one which fades in, you may lose some of the start.

Whenever possible, I prefer to start sampling, then play the sound and later remove the 'silence' from the beginning. You may have to increase the buffer size to do this but as you can save, load, append and overlay samples, this should present no difficulties.

If you are creating samples to be played from another program (perhaps as sound modules) such as *Maestro* and you need to keep them short, check your sampler's oversampling or resampling function.

These involve sampling at a high rate and then taking an average of the sample points to reduces the sample in size and allow it to be played at a slower rate. This can be very effective and reduce the sample size without any noticeable deterioration of the quality.

Finally, don't forget to save often, especially before an irreversible edit.

FOR BEEB USERS

Some of the waveforms in the Hybrid Music System are pseudo samples. The click amplitude envelope can be used to play just one cycle of a waveform and is used for this purpose in the Drum sound. If you progressively lower the pitch of the waveform, it lengthens the 'sample'.

So, GET the Drum word into the Notepad, type 1 VOICE, press TAB to enter edit mode and site the cursor on the - 10 PITCH value. Press F1, then RETURN to hear the drum. Now reduce the PITCH value to -60, press F1 and RETURN to hear a burp! This is effectively the waveform slowed down.

Finally, I'll bet you thought it wasn't possible to play sound samples through the Music 5000. See the next music column for details!

Ian Waugh

NEWS IN BRIEF

● A new software package has been released by Hybrid Technology. The Ample Toolbox contains five integrated modules:

The TEDIT text editor is a 40/80 column insert mode text editor with a vertical and horizontal scrolling edit window to edit several Ample words at once.

The IEDIT image editor lets you enter and edit mode 7 screen displays using text, graphics, colours and effects. Functions include paint, block copy, scratch pad and so on.

UTILS contains 15 new Ample commands for program development, including compile, merge, spare delete, and so on.

SIDEMOD stores Ample modules in sideways Ram for immediate access freeing disc space for programs.

The Disc Program Recoverer will search any floppy disc for lost Ample programs.

The Ample Toolbox costs £39.10 inclusive of postage and a 40-page manual.

● A new hardware release from Hybrid Technology is the Music 5000 Synthesiser Universal, a low-cost entry-level package in the Hybrid Music System range which provides high quality sound output for any standard BBC micro music program.

Designed primarily for use in schools, it can be expanded to a full Hybrid System at any time.

Price should be around £100 and it will be launched at the BETT show at the Barbican in January. Hybrid Technology is on (0223) 420360.

●If you have any music news or if there are any topics you'd like to see covered in this column, write to Ian Waugh at *BBC Acorn User*, 20-26 Brunswick Place, London N1 6DJ.

NEXT MONTH Coming soon to BAU . . .

CONQUER RISC OS

The March issue of *BBC Acorn User* reveals the secrets of Risc OS – how to write applications to take full advantage of the Archimedes Wimp operating system. Windows, menus and icons laid open to the world. We give a complete Risc OS skeleton program to use for your own applications.

The model B and Master users get a treat next month too. We present the first half of a complete Small Cobol. Get to know this most popular of languages and for the first time run it on the Beeb.

And of course the second part of the *BAU* Awards presentation takes place in the March issue as well. Take your seats (evening dress, please) for the hardware and general awards gala ceremony.

The educational floor turtles, Roamer and Pip get a look-in to the March issue. Plus we have the low down on Minerva's new relational database package, *Multistore* and on Acorn's long awaited new operating system Rom for the Master 128.

There are reviews too of Qume's low cost Crystalprint Publisher Postscript laser printer, the Risc OS *Artisan 2* art package, alternative pointing devices for the Arc and A3000, educational database packages for the Beeb and a couple of monitors for the Arc.

Plus, next month has the usual blend of the solutions to all your problems in *Questions and Answers, Risc Revue* and *Eight Bits,* and all the latest news and views in the Acorn world.



MAKE SURE OF YOUR MARCH

BBC ACORN USER

ON SALE 8th FEBRUARY 1990



THIRD TIME LUCK

Roger Carus' article on spreadsheet software in *BBC Acorn User* December 1989 gave a rather misleading impression of the current state of the market on the Archimedes. This was presumably due to the long leadtimes necessary for publication but readers should be aware of latest developments.

First, the version of *Pipedream* being referred to was version 2 although many readers will have thought that Roger Carus was referring to version 3. *Pipedream 3* completely supersedes version 2. and costs £147+VAT not £89 as stated.

Second, and more serious, is that the article took no account of Risc OS which is now the standard on Archimedes computers. The conclusion that the package one should choose depends partly on what intergrates best with other software I agree with completely.

Pipedream 3 is the only available spreadsheet program (indeed, the only available wordprocessor, too) to have been developed for Risc OS and it integrates completely with the Risc OS desktop and other Risc OS applications.

Roger Carus referred to both *Logistix* and *SigmaSheet* which were written for use with Arthur, and Acorn and Minerva have indicated publicly no plans to develop these spreadsheet programs for Risc OS.

Risc OS users should consider very carefully whether they want software which multitasks in the desktop environment and co-operates with other software, or software with a completely different user interface which uses the old one-at-a-time approach.

Finally, *Pipedream 3* integrates with other applications by being able to load directly *View, Viewsheet, 1st Word Plus,* CSV and plain Ascii files and can save Acorn DTP, *View,* CSV and plain Ascii files. It can also incorporate sprite files and Draw files. It is this level of



integration, amongst other unique features, whch makes *Pipedream* the best selling spreadsheet program on the Archimedes.

Rob MacMillan
Colton Software

Thanks for all that. You will have seen by now that *Pipedream* has won the Best Business Software (32-bit) award for just these reasons. *Pipedream 3* is currently laid bare on the *BAU* workbench and we will be reporting back our findings soon.

In passing, it is worth noting that although *Logistix* and *Sigmasheet* may not see the light of the Risc OS day, both Acorn and Minerva have plans for Risc OS spreadsheets in the future. Watch this mag!

MAKING MONEY

So, locking yourself in the bedroom for 12 months or so, with nothing but your BBC computer, you slog away at this incredible program which throws up problem after problem, which of course you sleep on, and lose sleep on, until finally, one day, after numerous false calls, your masterpiece is complete. Surely a time for celebration...a sense of achievement... etc, etc.

Yes, well, that's quite true but what you really want is for other people to appreciate this wonderous new software, and perhaps, make a bob or two in the process. So, *BBC Acorn User,* what avenues can one follow? What are the alternatives? What does one do?

Frank Chaplin
Withney, Lancashire

The quick answer is that if we all knew how to make lots of money from our programs we wouldn't be here producing *BAU* (well, we would really 'cos we do it for love). The first and best option is to send your programs to *BAU* for publication. That gets you buckets of fame and a few coppers for the pub.

Otherwise it's a choice between convincing an existing publishers to take on your masterpiece or going it alone and publishing it yourself. We hope to be carrying an article on how to go about this in the near future.

THE BUSINESS

Why is it that writers in *BAU* are obsessed with 24-pin impact dot-matrix and laser printers?

24-pin printers are very nice, but not so good for DTP applications and the notion we can all afford to rush out and buy laser printers is laughable!

You seem to be totally ignoring inkjet dot-matrix printers, with the sole exception of the Integrex 132. That has been around for five years or so, is colour-only, slow and requires very high quality paper for decent results.

The printer I am using now is the Hewlett Packard Deskjet Plus printer. Mine cost £499+VAT from Parallel Computers (UK) Ltd in Borehamwood. For your money you get a 300DPI Laserjet compatible printer with Centronics and RS232 interfaces and even with ordinary typing paper the quality is close indeed to that of a laser printer costing far more.

So extract the proverbial digit and get it reviewed!

Richard Sterry
Wakefield, West Yorks.

No sooner said than done a year ago! A review of the Deskjet appeared in the February 1989 issue. The Deskjet Plus is a little faster and has more fonts included.

However, 24-pin dot-matrix printers remain the most popular type at present. Nevertheless, *BAU* will be looking at inkjet printes in general in a future issue.

NOW C HERE

I refer to the letter from Dr. A J Travis published in your January issue referring to your view of our Small C.

Mijas Software would first like to take this opportunity of publicly thanking Dr. Travis for giving his permission to use his original code.

Anyone who has a copy of the Mijas system will know that his copyright and that of others is fully acknowledged within the code itself.

We have also taken special care to sell the overall product in such a way the price reflects the items added by ourselves and the part of the code derived from Dr. Travis' earlier work is distributed at cost.

Since the original contact, the two systems have diverged in many ways. The Mijas code is based on a fully modular, relocatable assembler, linker and source level debug system which facilitates rapid code development and test and allows fully selective libraries.

It also adds a very efficient optimiser to the original 'psuedo machine' and has been ported to the Archimedes as a cross-development system rather than to the IBM PC.

Both system give 'Source Code Portability', Small C code can be easily re-compiled on the Archimedes using Acornsoft Ansi C allowing common code acros all BBC micros from the BBC B through the Master series and on to the Archimedes, A3000 and R140.

Finally, I must endorse Dr. Travis' comments on the need to teach the next generation of programmers in a way which will prepare them for the open system of architectures of the future and not in ways specific to any particular machine.

John Evans
Mijas Software



QUESTIONS AND ANSWERS

Q I've a BBC A3000 with a single disc drive. When backing up discs I seem to be continually swopping discs. What am I doing wrong? Why isn't all that 1Mb of memory being used?

A You should remember to use your parameters! When you are backing up a disc don't forget to use the Q parameter as in:

```
*BACKUP 0 0 Q
```

This uses the full memory available for making the copy. It will save lots of disc swops.

Q I have a BBC model B and an Epson LX-800 printer and I have been experiencing some problems in the printing of French characters when word-processing with *Wordwise Plus*.

A You can change to the French character set with most Epson printers by using the ES82,1 embedded command. You will then have e-acute in place of the open curly brackets, e-grave in place of the closed curly bracket, u-grave in place of the bar character and c-cedilla in place of the back slash.

Remember that to get the u-grave printed out you will have to change the *Wordwise Plus* pad characters to, say, the asterisk, otherwise a space will be printed out instead.

If you want to make other accent characters such as the a-circumflex, you will need to send to the printer the 'a' followed by a back space and an up arrow character. This means embedding OC8,94 into the text. Which makes the text very untidy and muddled.

The main problem with all these methods is remembering which character is which in the edit mode when you are writing

You could get round this by re-programming the characters and can I refer you to a special program for doing this published in *The Complete Wordwise Plus Handbook* by Paul Beverley, published by Norwich Computer Services.

Q I know it's the football season but I'm already getting prepared for the summer and the cricket. I'm looking for a computer program to sort out our team's batting averages. Do you know of a specialist program that offers this type of facility?

A A *Cricket Averages* program is published for the BBC micro by Old Isleworthian's Cricket Club. It costs £20. For further details write to the Secretary at 9, Stanley Close, Isleworth, Middlesex TW7 4LG.

Q I want to protect some of my BBC discs so that 'prying eyes' cannot read the catalogue and know the names of the programs.

This way they will and therefore not be able to load the programs in. I would prefer to use a program to do this rather than use a sector editor or something complicated. Can you help?

A In the May 1988 issue of *Acorn User*, we published a couple of clever little routines which appear ideal for your needs. They provide two new star commands called appropriately *HIDE and *SHOW. When *HIDE is typed followed by the drive number all the files present at the time 'disappear' from the catalogue. The *SHOW (on a Master 128 it has to be */SHOW) followed by the drive number displays the previously missing programs.

Q At work I use *Wordperfect* 5.0 on an IBM PS/2. At home I have an Archimedes 310 with a 40Mb hard disc. Can I run this great wordprocessor on my Archimedes?

A You certainly can. But you will have to run *Wordperfect* under the Archimedes PC Emulator as there is not a native mode version of package.

If you partition your hard disc so that there is a 10Mb MS-Dos section, you will be able to run the 3.5Mb of code *Wordperfect* uses from there.

If you have a problem with an Acorn micro, commercial software or a program you are trying to write then *BBC Acorn User* can help. The Post A Problem service guarantees to give you a personal answer within 10 working days for just £4.

Write out your problem with as much detail as possible and, if a program is involved, include a disc or cassette. Fill in the coupon at the bottom of this page and send it and your problem along with a cheque or postal order for £4 (including VAT) made out to Redwood Publishing. If you want recorded delivery add on the cost of this.

Please note that debugging readers' own programs or those from other magazines is a complex task and we cannot guarantee to give a full solution. Unless the problem can be spotted quickly, the Post A Problem service will only be able to make general comments. The service will answer the problem and return all material received within 10 working days of receipt. If we fail to match this promise then your cheque or postal order will be returned – you can't lose!

BBC ACORN USER READER SERVICE
20-26 Brunswick Place, London N1 6DJ.

NAME ______________________

ADDRESS ______________________

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POSTCODE ______________________

DAYTIME PHONE NUMBER ______________________

I enclose a cheque/postal order for £4 made out to Redwood Publishing and an sae with my problem.

OFFICE USE ONLY Date in:

Date out:

Answered by:

Q I want to set my Archimedes clock from Basic. How is this done?

A You need to set the SYS$ TIME option. Type in *SHOW to show all the option settings. Then type:
*SET Sys$ TIME hh:mm:ss
where hh is the hours, mm is the minutes and ss are the seconds. Don't forget to use 24 hour time.

Q I am confused, I thought the BBC micro had a standard RS232 or RS432 port. However, I understand the RS232 standard consists of about 20 different lines but I note that the BBC RS432 only has five. What is going on?

A You are quite right, the full RS232 standard consists of some 20 lines but many of these are for very specialized use. Most computers actually only use about 10 of these lines.

The BBC RS432 port in the BBC micro uses only five of the lines common to the full RS232 standard. In most applications only three lines are necessary!

Q I've heard the Acorn Floating Point Card is now available for the Archimedes and that it can increase calculation speed a great deal. Can you tell me by how much?

A The Acorn FPC costs just under £600 and it can increase the speed of floating point calculations by a factor of about eight.

However, when other operations are involved, such as integer calculations and writing to the screen, the increase of speed is 'diluted' – usually to 'only' about three times normal.

Q What screen resolution can I expect when I use the PC Emulator on an Archimedes? Will it emulate the EGA standard?

A The resolution of the PC emulator is CGA and not EGA or VGA.

This is the 'standard' IBM PC display, although the Archimedes monitor does display this much better than most PC CGA monitors.

Q I use a Silver Reed EXP240 printer with my BBC micro which has *Wordwise Plus* installed. Unfortunately I cannot get the software or the printer to underline the text.

A The Silver Reed printer is not Epson compatible and the US and UE embedded codes in *Wordwise Plus* expect the printer to follow the Epson standard.

Norwich Computer Services publishes a specialized program especially for *Wordwise Plus* for Silver Reed EXP500 users to help them access the printer's effects. This model uses the same codes as your EXP420 and should solve your problems.

Q I've got a BBC model B with a 512 board connected fitted in a Watford co-processor adapter and I'm interested in using compilers with my set up. What exactly is available.

A There are a whole host of compilers available that will operate with the Acorn 512 board. They all suffer from memory problems, but these can be overcome.

All the Borland compilers except Turbo Basic work. Some of the Digital Research ones will operate but problems will be experienced with DR Fortran and DR Pascal. I know that Ztech C is another possibility.

None of the Microsoft packages in this field work, as they will only function with MS-Dos running.

ACORN CUSTOMER HOTLINE

A new version of the PC Emulator is available. This new version (1.33) will be of particular interest to 400/1 series and A3000 users who may have noticed that when using the emulator, the disc drives are more noisy then usual.

The new version changes the step rate of the heads to make it quieter. Also with the new version is a SCSI hard disc installation program.

Version 1.33 can be obtained directly from SID if you are a registered user (if you have logged on before via Prestel or have registered directly with Acorn for use via Fastrak) or from your local SID registered Acorn dealer.

The latest version of the PC Emulator has new installation routines for both ADFS hard discs and SCSI hard discs. The !Readme file inside the installation application draws attention to the need to correctly set up your partition.

The hard disc partition appears to MS-Dos to be a drive with four heads and 17 sectors of 512 bytes per track, irrespective of the physical hard disc's characteristics. The default 10Mb hard disc size has 300 logical cylinders, giving a total partition size of 300x4x17x512 =&9F6000.

If you create a different partition size keep it to a multiple of the logical cylinder size (&8800, 4x17x512).

Earlier versions of the PC emulator created their partition file in the directory $.PC. Under the new emulator you can place this anywhere on the hard disc.

We are still compiling a list of PC software which runs under the PC Emulator, so if you know of any packages that run under the emulator please write and let me know.

Many thanks to the people who have already responded.

● After a number of requests we have produced an application note for users of the *Acorn Desktop Publisher* on 1Mb systems. The note is a step by step guide on how to get the DTP application up and running on a 1Mb computer.

It can be obtained by sending an A4 SAE to our Customer Services Department. If you wish to make a technical enquiry at the same time please use a separate letter.

● Acorn has recently reduced the price of a number of Master series and BBC software items. Note that all these prices are exclusive of VAT:

C for the Master series and BBC B/B+ with second processor: £39. MicroProlog Rom: £29. 6502 Development System: £29. *Viewspell*: £29

Prices have also been reduced on the following hardware: Archimedes 305/310 hard disc upgrade: £399. Arc Rom Podule: £45. MIDI add on to the I/O Podule: £29. Stacking FileStore hard discs: 40Mb. £799, 60Mb. £999

● A number of people have experienced problems using the LQ-850 and the Acorn DTP package. Early versions of the LQ-850 software do not support the escape sequence required for printing at 360x360 dots per inch.

The version of the Roms that do work correctly are numbers N91785 and N92687. To find out which Rom you have, switch the printer on while holding down the Form Feed button (a power-up self test), the first thing printed is the version number of the Rom.

If you have a version which is not one of the two listed, you can get a new printer Rom from Appropriate Technology, Aptec House, South Bank Business Centre, Ponteon Road, London SW8 5AT.

Peter Dunn

EIGHT BITS

£10 WORDWISE PLUS GAME

Andrew Hayward from Wokingham in Berkshire is a *Wordwise Plus* user and has written a couple of games using the *Wordwise Plus* programming language.

As you know, this language is really designed for producing macros and other text control, but it can also be used as a general purpose, if somewhat slow programming language.

The first is an arcade game (surely the first in this programming language), in which you have to guide your rocket ship down a narrow alley, without touching the sides. The whole program is written in *Wordwise Plus*, except for a small four line piece of machine code, written because there is no USR command in Wordwise Plus.

To use the program, type the listing into any free segment (say, segment 0) using *Wordwise Plus* and then save it. Then run the program in the normal way, by typing SHIFT-f0.

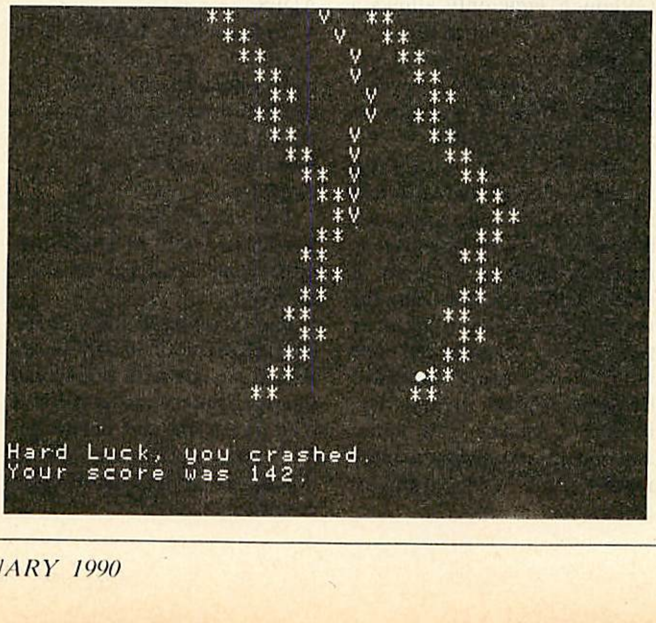
The small piece of machine code included should be typed in as a separate listing. When run, this saves a file MCODE to disc. This should be present on the game disc and will be loaded automatically by the main listing.

The second program is a text adventure game. The game is split into two parts, the program itself, loaded into segment 0, and the data for the adventure, loaded into segment 1. The game is started by pressing SHIFT-f0, and once run, is similar to most adventure games.

Full information on using the program can be obtained by typing HELP at the prompt. You must not press any keys whilst the program is 'thinking', otherwise these will be entered into the data segment, crashing the program.

A clever feature of the program is how Andrew has implemented the string parsing in the adventure. As you may know, *Wordwise Plus* has no string handling commands and so the parser is operated by putting the input string into segment 9, using the cursor control commands to search the string for spaces and finally working out what verb and noun have been input. This is the main reason why the program is somewhat slow in responding to your input.

Altogether a very interesting pair of programs which show what can be done with the *Wordwise Plus* programming language.



£5 EXTENDED VECTOR LIST

Bill Hine from Wimborne has written to say that he was delighted with Jason O'Broin's Vector List program (*BAU* November 1989) which will be very useful to him. But, as he likes to write software for sideways Ram, it would have been even more useful if the program had also listed the extended vectors.

Bill has therefore written some additional lines of Basic which will enable it to do just that. Since there is a lot of unnecessary information in the two lists of vectors, the program suppresses the output for any vector which has not been changed. That is, the details for any given vector are only printed out if either the standard vector or the extended vector has been changed from its default value.

This is tested by the routine test_vec which returns with the carry flag set if the data is not to be printed. The default value for an extended vector, incidentally, is &000000.

The first part of each line of output is just as in Jason's program – the vector table address and name, the currently set address, followed by the default value.

Next the data from the extended vector table is printed out (by the routine extvecs) but only if the given extended vector has been changed. If so, the extended vector table address is printed (in white) followed by the currently set Rom number and the Rom address. These are printed in green and marked with an asterisk if active, otherwise they are printed in red. The colours, of course, only appear in mode 7.

First type in the Vector List program from November's yellow pages taking care not to alter any of the line numbers. If you have already saved a copy, check the line numbers are as shown. The new program (VECTOR+) should then be typed in just as it appears. It is important not to omit lines 220 and 350 even though they contain only a colon, as they effectively delete unwanted lines from Jason's program.

Save the program as VECTOR2. When you run it, it will create a new version of VECLIST which can be called as before with *VECLIST. Note that on a Master, the characters 129-135 should be redefined as spaces or an unusual display will result. This can be done with a line of Basic:

```
FOR I=129 TO 135:VDU 23,I|:NEXT
```

£10 VIEW PAGE PREVIEW

Andrew Pillidge, author of the *View* splice utility published in these pages in the August issue, has produced another utility for *View* users, this time a page previewer.

This is a program which shows the current *View* document on screen as a graphical image by representing each character with a pixel, leaving gaps where the spaces go. This allows you to see an accurate picture of the layout of the page, particularly where the text is more than eighty characters wide and the SCREEN command does not give an accurate picture.

Long-time readers will remember a similar program written by Graham Bell, published in the July 1987 edition of *BAU*. That one was slightly different to Andrew's, as it was installed as a *View* printer driver rather than as a standard machine code program, but both programs work on the same principle.

Unlike Graham Bell's program, this one will display the graphical image of a full 132 columns, the maximum width of the *View* editing area, but unlike Graham's, the program can only be used with *View* and not the other *View* family applications.

To use the program, type in the source code listing in the yellow pages and run it. A machine code program called PREVIEW will be generated and saved to disc. The program runs in pages &9 and &A of machine workspace which is normally safe, and does not conflict with *View*. Also used are locations &90-&9F of zero page, usually reserved for Econet workspace. If you want to use this utility on a network, you will probably have to change this workspace to start at perhaps &70 or &80.

Once assembled, you must set *View* to run in modes 0 or 4 or the shadow equivalents, modes 128 or 132. If the current screen is a non-graphics mode (3, 6, or 7) then PREVIEW will run without error but no output will be generated.

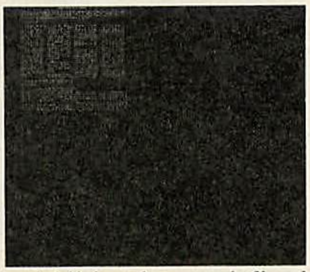
The *View* document to be previewed must be loaded into *View* and then type *PREVIEW (or *RUN PREVIEW) with the preview file on your current disc. The screen will clear and your text will appear a page at a time, using small dots for each character. When a page is complete, the program will pause, waiting for a keypress. Pressing a key will display the next page, and so on until the document is complete.

The vast majority of *View* commands are reproduced, although the following are not: PE EP OP DH DF HT TS PB FO HE DM EM SR and LS. The leading blank lines of TM and HM are not displayed, although the left margins are portrayed.

It was not possible to squeeze in headers or footers and macros should be avoided since the method of dealing with embedded commands may cause some macro letters to be incorrectly recognised (KF or SG will be interpreted as CE).

The size of the screen means the maximum page length is 112 lines and the maximum width is 320 characters (although *View* only allows a ruler of 132 characters). If highlight codes used in the text affect the width of your characters, these will not be accurately represented.

The program works by scanning through the *View* text and reading the characters one at a time. As each character is read, providing it is not a space, a dot is plotted using the machine code equivalent of PLOT 69. The program can cope with the soft spaces embedded by *View* whilst formatting, indented rulers and some embedded commands, namely LM PL CE LJ RJ TM HM FM and BM commands.



Additional user defined rulers are also represented. However, because of the varying printer possibilities, the program cannot be a true WYSIWYG representation all the time. It is possible to change the form of the display to spread the pixels out a bit more, by altering the increments in the .incx and .incy routines.

For example, to produce a chunkier display in mode 4, change the ADC #4 command to ADC #8 in .incx and the SBC #8 command to SBC #12 in .incy.

£5 ECONET PASSWORD

Regular contributor Jason O'Broin has produced another useful utility, this time for Econet users. For those of you who don't know Econet, instead (or as well as) a disc drive, you are connected via the Econet cable to a fileserver (usually with a hard disc) with a hierarchical directory structure somewhat like ADFS.

Each user has full access to his or her own directory (normally one level down from the root) and any subdirectories within their own directory and restricted access to the other directories.

The restriction works by having two sets of attributes, rather than the single set used by ADFS.

For example, if a file in the root directory had attributes WR/R, anyone with full access (known as owner access) could read and write and delete the file but restricted access (known as public access) users could only read it.

Public access files are always regarded as 'locked' and users can never delete, rename or change the attributes (*ACCESS) the file.

To start using a network fileserver, you have to 'log on', by issuing the command *I AM <name> <password> or more sensibly *I AM <name>: which prompts you for the password but does not echo it to screen. This is to make sure users cannot log on under a false identity and gain access to other people's files.

Unfortunately, changing your password does not have the same level of security. The command to do this is *PASS and there is no way of not showing the passwords on screen as you type them.

As every user of computer security systems knows, a password is not very secure if it can be seen when it is being typed, especially with Econet, where unbeknownst to you, someone may be *VIEWing your screen!

This utility, which can be saved in the network fileserver library, offers an alternative method of changing the password. Just type *CP, and you will be prompted for:

```
Old password :
New password :
Re-enter     :
```

and none of these will be displayed on screen.

At the first prompt, type your existing password. At the second, type the new password you wish to change to and then type it in again at the third prompt. The password will then be changed, without anyone ever seeing what you typed. As the password is not being echoed, you are asked to retype it so that there is no danger of mistyping anything. If both entries are not the same, the password is not changed.

After executing, the program wipes over the memory area where it stored the password so no trace of it is left in memory, again to prevent anyone accessing your

machine's memory to read the stored password.

Type in the program listed in the yellow pages and the machine code file CP will be saved to the current filing system. This should be copied into the library directory of your filseserver.

The program works by simply accepting your old and new password and then appending them to the string PASS in memory. The entire command is then passed to OSCLI in the normal way.

Note that the PASS command itself must also be resident in the Econet library for the program to work.

The program is assembled at &E23, the normal place for small Econet utilities, and occupies only 213 bytes.

£10 HIERARCHIAL COMMAND

Regular contributor Joe Abley of Bedford has provided yet another useful utility for users of BBC/Master machines with a hierarchical filing system (ADFS or Econet).

The idea is that on typing *ALLDIRS followed by a normal OS command, the command will be executed inside every directory from the current position in the directory tree downwards.

For example, consider a directory on an SJ Research network containing many sub-directories in which it is required to remove public read access from every file and directory. With *Alldirs* it is simple. Since *ACCESS * -/r would perform the operation on any particular directory:

```
*ALLDIRS ACCESS * -/r
```

will perform the operation on every directory in the tree. Similarly *ALLDIRS CAT and *ALLDIRS EX do the same thing as the CATALL and EXALL programs on the Master 128 Welcome disc.

By typing *ALLDIRS INFO where the filename contains * or # characters, the command *FIND , which has appeared in *Hints & Tips* before, is swiftly imitated.

In short, this program is capable of performing a great number of useful functions which otherwise would require a separate program each. But beware – if the command you append to *ALLDIRS is itself a transient utility (a machine code program loaded from the library, rather than a Rom-based star command) then the program must not run at &900 as this is where the *Alldirs* code itself resides.

Of course, it is perfectly straightforward to assemble *Alldirs* to run at a different location in memory.

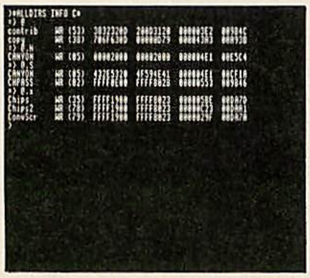
The only drawback to the program is that it is not very practical with commands which require unambiguous filenames or other data, such as DELETE, although DESTROY and WIPE work perfectly well.

The program begins by using 0 with A=1 and Y=0 to read the rest of the command line which it stores at &700, a safe page to store things in in many languages.

If this location is going to cause problems for your particular machine then alter the variable 'comm to point to somewhere else.

Bear in mind that up to about 250 bytes may be required in extreme cases.

The program then stores the old error vector and redirects it to its own routine, so that if an error occurs, it doesn't leave you stranded in a strange directory. Next a recursive subroutine is called ('searchdir') which basically performs the guts of the program. More about this later.



Finally, the error vector is restored to its original value and if the top bit of location &FF is clear (ESCAPE has not been pressed), the program returns to Basic. If ESCAPE has been pressed, the program performs *DIR ^ until you are returned to your original directory, where it aborts with the error 'Escape'.

This subroutine does the equivalent to the following pseudo-Basic procedures:

```
DEFPROCsearchdir(dir$,com$)
PRINT "=> ";dir$
OSCLI com$
REPEAT
  PROCget_filename_from_curren
t_directory
  IF NOT done AND item_is_a_di
r THEN PROCprocess_filename(dir
_name$)
UNTIL done OR escape_pressed
ENDPROC


DEFPROCprocess_filename(dir_na
me$)
OSCLI "DIR "+dir_name$
PROCsearchdir(dir$+"."+dir_nam
e$,com$)
*DIR ^
ENDPROC
```

Several points are worth noting about this. First, note the elegant way in which the program is structured. By recursive programming, a simple algorithm can be written to apply to a single directory only, without worrying about any sub-directories, as any sub-directories found will simply use the same routine.

The 6502 machine stack is used to store four bytes during each recursion – two bytes pushed by the JSR instruction, the sequential pointer to be used by successive OSGBPB (A=8) calls, and a pointer to the pathname string which is stored in memory.

So theoretically, the program is limited in the number of sub-directories it can delve into by the size of the stack (256 bytes). Assuming the stack will not be empty on entry to the program, probably about 50-60 levels of sub-directories will be coped with – should be enough for most trees!

The pathname of the directory currently being searched is stored in memory. After a few sub-directories have been delved into, the string will get rather long to store in memory (remember potentially 11 bytes per directory entered). This would cause the program to overwrite page &B and perhaps even &C and &D (arrgh!) for really deep trees. &B and &C cause problems on Masters using Econet, as well as annoyance for Beeb users who value their soft-key definitions.

So, the length of the pathname stored is limited by the constant 'limit' (initially set to 64 to prevent overflow into page &B). Any pathnames longer than this are not shown in their entirety but are suffixed with '...' to show that they are incomplete.

So there you have it – a single routine which makes CATALL, EXALL, FIND and many other routines obsolete. It may even be worth writing machine code utilities with this routine specifically in mind.

MORE APPLICATIONS PLEASE

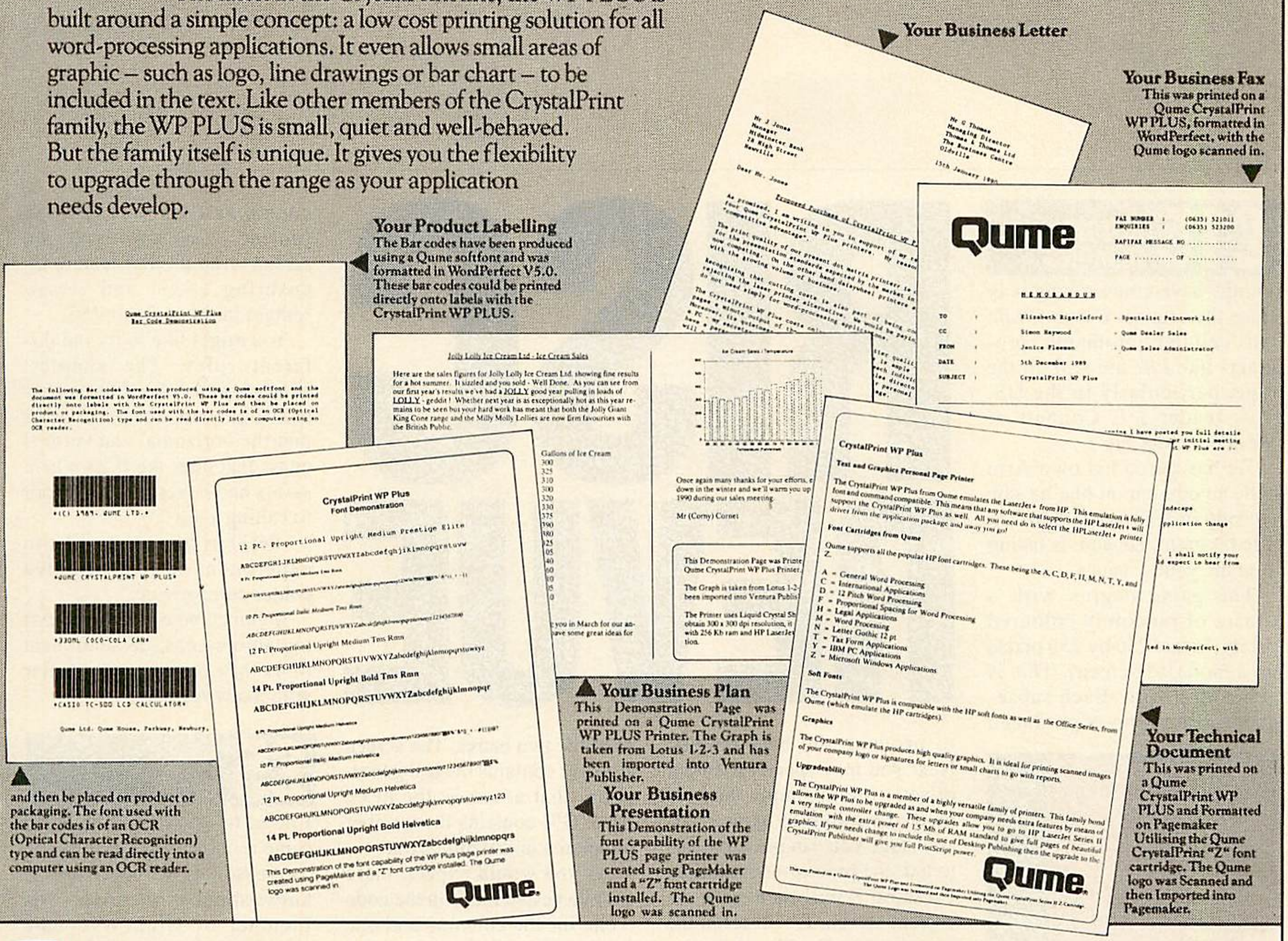
I am still getting many more submissions on programming than on using applications, and many of these are reiterating ideas that have been done many times before.

There are few tips being sent in on using popular packages such as those from Computer Concepts, Watford Electronics and Beebug and I would really like to see a lot more of these.

In these days of machine connectivity, tips are also welcome on the use of other machines with the BBC. Remember also that listings should be in the *BBC Acorn User* format – one statement per line and with all variables in lower case, and the accompanying text should be supplied in both printed and disc form.

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Your Business Fax
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and then be placed on product or packaging. The font used with the bar codes is of an OCR (Optical Character Recognition) type and can be read directly into a computer using an OCR reader.

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This Demonstration of the font capability of the WP PLUS page printer was created using PageMaker and a "Z" font cartridge installed. The Qume logo was scanned in.

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 For Archimedes and A3000 owners DAVID ACTON has compiled his

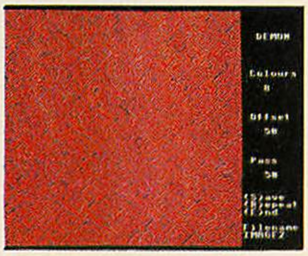
RISC REVUE

£15 AUTOMANIC DEMONS

Things have come a long way since the original *Game of Life* but 'cellular automaton' programs like *Life* are still all the rage, particularly in the US, says reader J E Connett of Westcott, Dorking.

He has based his own Arm code automaton on one he saw recently in *Scientific American*. The program, *Demon,* is listing 1 on the yellow pages.

The game begins with a square of randomly coloured pixels (in fact 256 by 256 pixels on a mode 13 screen). This is generation zero. Each subsequent generation is produced



by changing the colours of pixels according to a simple rule.

Let the number of different colours available be n. Each pixel is compared with its four neighbours and, if any of these has a colour number 1 greater or n-1 less, the pixel is eaten by its neighbour. That is, the pixel becomes its neighbour's colour.

Wrap-around is used, so the left and right edges of the screen are considered joined, as are the top and bottom.

You'll notice several stages in the development of the 'population'. First, colours coagulate into larger irregular patches. Next, straight edges appear and finally, square spirals emerge and grow until they dominate the screen.

These spirals were called demons by the inventor of this type of automaton, hence the title of Mr Connett's program.

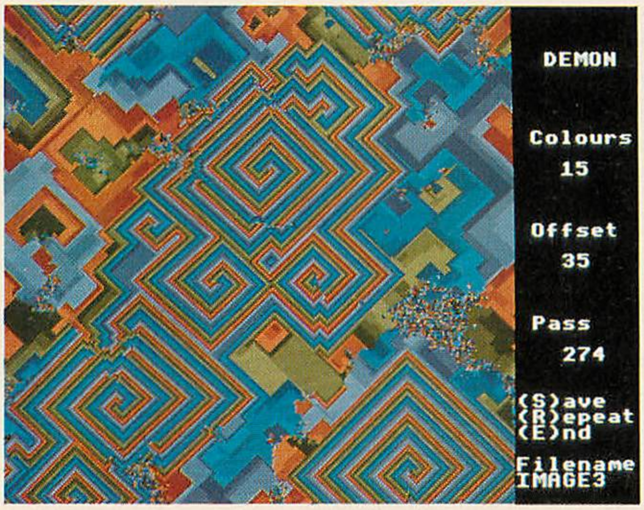
On running the program you can enter two parameters. The first is the number of colours – values between 8 and 15 seem to produce the best results. Next you may specify a colour offset – this is simply the base mode 13 colour to be used. At any stage you can press ESCAPE to halt the process of evolution. Pressing S will then save the current screen, R will rerun the program and E will end.

The program uses two mode 13 screens and swaps between them for smoother evolution. You'll need at least 160K of configured screen memory. The work is done, of course, by a piece of machine code.

Three parameters are passed to the code from Basic as integer variables. E% and F% (registers R4 and R5) are set up to contain the screen start addresses of the two banks. The screen at screen1 contains the last generation; that at screen2 the next. Also, G% contains the number of colours in use minus one.

As you would expect, there are two nested loops in the code – one for the columns and one for the rows. The variables, row and col, contain the position of the pixel being examined and newrow and newcol are used to check out its neighbours.

The subroutine .comp makes the colour comparison and if necessary, 'eats' the current pixel. On return from .comp, the zero flag indicates whether the pixel was chomped by its neighbour or not. If it survived on all fronts, its old colour is copied across. Note that the routine .comp sorts out the screen wrap-around feature by ensuring newcol and newrow remain in the range 0-255.



You might like to try out different rules. The simplest example is to check the diagonal neighbours of a pixel rather that the horizontal and vertical ones. Just alter the lines where newrow and newcol are set up prior to calling .comp.

Perhaps you might like to experiment with alternative colour comparisons.

If you come up with interesting automatons, do send them in as they are always popular with many readers.

£5 !HELP HELP!

I have to admit this little tip came as rather a surprise to me, so please forgive me if you all know about it already! Chris Fletcher of High Wycombe reveals all about !HELP.

It appears that aside from all the other files beginning with ! that clog up our application directories these days, Risc OS takes note of any called !HELP. If an application contains a file of this name, the filer menu for that application has an extra 'help' option added to it.

Selecting this causes the !HELP file to be executed. Often this file will be a text file, in which case it will be loaded into *!Edit* if available. It could as easily be a Basic program.

Incidentally, the only applications I have found to make use of this facility are *!Formed,* the template editor and the font editor *!FontEd.*

£15 RAPID ROOTS

Someone recently asked me how to calculate square roots quickly in Arm code. Regular contributor Colin Attenborough of Waterbeach has provided a concise and speedy solution and his program is listing 2 on the yellow pages.

The number is passed to .root in R1 (as B%) and the square root is returned in R0. Note that if the original number was a perfect square, the register min will contain zero on exit.

Of course, .root only calculates the integer part of the root but this is invaluable in many situations. The example that springs to mind is that of 3D graphics, where square roots are needed in the calculation of lengths and distances.

The method used is analogous to a textbook method for calculating square roots in base 10 on paper. Essentially, the number is broken down into pairs of digits. Take the leftmost pair (p say) and find the highest n such that n*n does not exceed p. Write down n as the first digit of a, the answer so far. Subtract n*n from p and append to the remainder the next pair of digits to form the next p. Now choose the highest n such that (20*a)+n)*n does not exceed the new p. Write down n as the second digit of the answer, take ((20*a)+n)*n) from p and bring down the next pair as before to form the next p.

Eventually, the square root is calculated and, if the last remainder is zero, the original number was a perfect square.

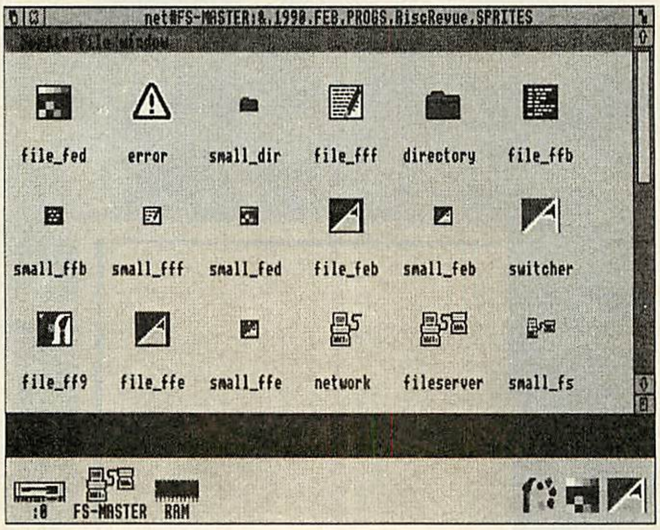
Colin's program uses this method but because the base used is 2 rather than 10, there is a slight difference.

First, the problem is simplified because each new n can only be 0 or 1. Secondly, n is chosen at each stage such that (4*a)+n)*n does not exceed the current p, the 4 replacing the 20 in the decimal version.

£5 POINTS OF VIEWS

Many moons ago we carried a mouse pointer designer (in the legendary column archaeologists believe was known as *Arc Agora*). Naturally, things have changed with Risc OS.

The subject is brought to mind by Martin Portman of St Albans. He points out that the default pointer shape is actually taken from a system sprite called ptr_default. To use your own shape, Martin suggests including a new sprite called ptr_default in the !Sprites of the !System directory.



To edit the Rom definition, you'll need to extract the Rom sprites so I've included a short program to do so – listing 3 on the yellow pages. Use *!Paint* to do the rest.

Any of the system sprites can be replaced with your own definitions in this way but you'll have to force the screen to be redrawn to see the effect. The easiest way is to press F12 then RETURN. (This could be done 'officially' by an application using SYS "Wimp_ForceRed raw").

Changing the pointer shape within an application is best done with SYS "Wimp_SpriteOp",36. Table 1 lists the parameters required by this call. Most commonly, an application might alter the shape when the pointer enters or exits from one of its windows. However, Risc OS will tell you when this happens.

REVUE UPDATE

We've had several submissions and comments on the subject of dates and time following Colin Singleton's submission in the November 1989 issue of *BAU*. Thanks to all who wrote in and apologies (especially to Colin) for the misprint. The last sentence should read 'subtract 31'.

One reader who wrote in was Michael Leete and you can read his ideas on the subject on page 74 of this very issue.

Did you spot the deliberate mistake in November's Agora? Yes – the European flag was upside down! Barry Wickett noticed the gaffe and has also provided us with a one-line, Beeb-compatible version.

His offering is listing 4 and for it he gets a fiver. (And please, I entreat you, if we print this one upside down, keep it to yourself...)

Lots of readers have written regarding perfect numbers and their calculation.

Most used the method described in the January issue involving such things as Mersenne primes and the ideas of Euclid and Euler. Thanks to all who shared their thoughts on the subject and sorry there isn't room to print them all.

Incidentally, Colin Singleton (of square root fame) mentions that the largest known perfect number has about 130,000 digits. Bet you can't work that one out on yer Spectrum!

There seems to be something up with the archiver program carried about a year ago in the old *Agora*.

I'm investigating the problem (which is rather difficult to repeat) and I hope to include a new version of the Risc OS archiver in a forthcoming *Risc Revue*. Watch this space.

As always, programs, ideas, hints and tips for these pages are most welcome – please send them to: *Risc Revue*, *BBC Acorn User*, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ.



Show the highly appreciative readership of this esteemed publication just what you can do (and get some readies for it too). Lummy guv, I don't rightly know what they'll think of next and no mistake!

RØ	= 36
R2	name of sprite (usually ptr_xxx)
R3	bits Ø-3 = pointer shape number bit 4 set: don't set up the shape bit 5 set: don't set up the palette bit 6 set: don't set the pointer shape number
R4	x coordinate of 'active' point (from top left)
R5	y coordinate
R6	scale table
R7	colour translation table

Table 1 Parameters for SYS Wimp_Spirte Op

CASPELL COMPUTER ☎ 0202 666155 [24 hr]

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Amstrad DMP 2/3000 series	2482	A
Amstrad DMP 4000	2426	E
Amstrad PCW8256 (L/Life)	*2741	D
Amstrad PCW9512	*2746	B
Brother HR15/25/40	*2696	B
Canon PW1080A	2223	D
Centronics GLP	2412	D
Citizen 120D/180E/LSP10	2488	B
Citizen MSP-40/50	2477	D
Commodore MPS801	2236	D
Epson FX/LX-80	2273	B
Epson LX/GX-80	2454	B
Epson LQ-500	2477	D
Epson RX-80	2273	B
Epson EX-800	2774	D
Epson Full Width	2320	D
Juki 6100 Daisywheel M/S	2563	B
NEC Pinwriter P1/P2	2254	D
NEC P2200	2844	D
NEC P6+/P7+	2870	E
Panasonic KXP-1081/1180	2228	D
Seikosha GP100	2317	B
Seikosha SL80 (L/Life)	*2741	D
Seikosha 500/550	2236	D
Shirnwa CP80/MT80	*2698	D
Tatung/Commodore CP80	*2698	D
Star LC10	2861	B
Star LC24-10	2868	B
Star NL10	2761	D

Many others - please enquire!

** = Avail. in Fabric Nylon **or** M/strike Film.* ***Please choose!***

*(Fabrics offer longer life and may be used with **Ribbon Refresh!**)* ☞☞☞

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Account enquires: 43 Emerson Rd., Poole Dorset BH15 1QS

SEE SOFTWARE SHOWCASE ON PAGE 134

EUROWORD

for WORDWISE and WORDWISE PLUS

Converts Wordwise to a European wordprocessor. Provides French, Italian, German, Scandinavian and Spanish characters grouped into five sets. For example:

French/Ital	German	Spanish
àçéèùòl	ÄÖÜäöüß	P¡¿Ñ¿ñç

Additional accented characters are easily produced by overprinting a UK character with an accent as in ê. Euroword supports a range of printers including Epson type dot-matrix, Diablo 630 printwheels and the IBM extended character set.

"Wordwise-using modern language teachers should fall on Euroword gratefully" – Times Educational Supplement, 3 Feb 89.

Charm Micro Soft
10 Hall Lane,
Longton, Preston.
PR4 5XB. 0772-616705

Euroword is supplied on disc. A backup disc and 40 page manual are included. Price £14.90 inclusive. Please specify your printer and 40 or 80 track disc.

Which Archimedes graphics software

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- ✔ has a built-in font editor?
- ✔ gives equal horizontal and vertical resolution?
- ✔ prints in monochrome or colour at up to A2 size?
- ✔ produces full colour-separation printout?
- ✔ can use both mouse and digitiser tablets?
- ✔ fulfils National Curriculum attainment levels?

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Archimedes

Model	Basic	Colour*
A3000	£649	£814
A410/1	£1199	See Special Offer
A420/1	£1699	
A440/1	£2499	

*With Acorn Colour Monitor.
Carriage £8/computer £12/system

PHILIPS CM8833 MONITOR

If you require the Philips CM8833 monitor with stereo sound facility, and ability to operate as a TV thru a video recorder, we can supply it at an extra charge as shown below. It will include a special lead with audio connection to the computer.

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for only
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Offer extended due to popular demand.
Archimedes 410/1 upgraded to full 440/1 spec plus Taxan 770+ Low Radiation Multisync Monitor and now also including The PC Emulator, a packet of discs, a printer lead and a mouse mat.
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Philips CM8833 14" Colour	**£209(a)**
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Taxan 770+ *LR* Low Radiation Col	**£415(a)**
CM1686 16" Hi Res (1280×1024) Col	**£1249(a)**
Taxan Viking II 19" Mono	**£849(a)**

Maintenance contracts available on above monitors.

Ask for details on techno scanner digitising tablet, expansion cards and software

We can provide attractive discounts to Education Authorities, Schools, Colleges and Health Authorities. Simply phone us or write, outlining your requirements, and we will supply a quotation.

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We not only offer professional advice when you are purchasing your system but we will also provide friendly assistance afterwards. We also offer the following incentives to make your purchase worthwhile.

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FREE COLOUR MONITOR with every 400/1 Base System

Offer limited to current stocks

Special Finance Deal

If you wish, you can purchase the systems listed below at NO EXTRA charge on our retail price and spread your payments over 13 easily manageable monthly payments. Deposit will be payable with the order followed by 12 monthly payments. Please phone in with the details of your requirements and we will send a detailed offer with the application form for the extended finance. Subject to status, we should be able to despatch your requirements within 48 hours of receipt of your order.

	Deposit		12 instalments		Final Cost	
	ex	inc VAT	ex	inc VAT	ex	inc VAT
A3000	£ 65.22	£ 75.00	£ 48.65	£ 55.95	£ 649	£ 746.35
A3000 (use with TV)	£ 78.26	£ 90.00	£ 51.64	£ 59.39	£ 698	£ 802.70
A3000 Colour	£ 95.65	£110.00	£ 59.86	£ 68.84	£ 814	£ 936.10
A410/1 Colour	£139.13	£160.00	£ 88.32	£101.57	£1199	£1378.85
A410/1 + Taxan 770+	£182.61	£210.00	£113.45	£130.47	£1544	£1775.60
A420/1 Colour	£217.39	£250.00	£123.47	£141.99	£1699	£1953.85
A420/1 + Taxan 770+	£304.35	£350.00	£144.97	£166.72	£2044	£2350.60
A440/1 Colour	£365.22	£420.00	£177.82	£204.49	£2499	£2873.85
A440/1 + Taxan 770+	£417.39	£480.00	£202.22	£232.55	£2689	£3092.35

We are a licensed credit brokers and can offer credits upto 24/36 months with an attractive APR of approx 19%.

And that's not all we offer!

When you purchase one of the above systems from us, you will also get a bonus voucher to purchase from our extensive range of add-ons, peripherals, software and accessories to enable you to get going.

Payment method:	with Extended finance	cash/credit card
A3000	£10 to spend	£65 to spend
A3000 Colour	£18 to spend	£80 to spend
A3000 (TV)	£12 to spend	£65 to spend
A410/1 Colour	£30 to spend	PC Emulator + £60 to spend
A410/1 Taxan 770+	£40 to spend	PC Emulator + £75 to spend
A420/1 Colour	£40 to spend	£200 to spend
A420/1 Taxan 770+	£50 to spend	£240 to spend
A440/1 Colour	£60 to spend	£250 to spend
A440/1 Taxan 770+	£75 to spend'	£275 to spend

The bonus vouchers will remain valid for 90 days from the date of purchase so you do not have to make an immediate decision on how to spend bonus money.
If you don't want the above frills ask for our barebone prices.

TECHNOMATIC UPGRADE SPECIALS

Our specially priced upgrades offer an economical upgrade to full capability of 410/1 and 420/1 systems as indicated below:

1Mb RAM upgrade	**£120(c)**	2Mb RAM upgrade	**£234(c)**
1Mb RAM + 20Mb HD	**£299(a)**	3Mb RAM + 20Mb	**£395(a)**
3Mb RAM + 40Mb (Toshiba) HD	**£629(a)**	3Mb RAM + 49.5Mb	**£699(a)**
20Mb HD + Controller (310)	**£349(a)**	HD Controller (310)	**£199(b)**

Ask for our price on 410/1 upgraded to 420/1 spec and save ££££s.

ON-SITE MAINTENANCE

Archimedes Computers like all other Acorn equipment are very reliable systems however, to give you peace of mind in the unlikely event of a failure, we now offer you an on site maintenance contract.
The contract will be through **Granada MicroCare**, Acorn's on site maintenance contractors who with **over 160 field engineers** and **8 strategically located service depots** in the country are able to guarantee **8 working hour service calls**, with no restriction on the number of calls you make during the year. Not many companies can offer such capability or guarantees. Contracts upto 5 years are available.
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*techno*SCAN

A versatile hand held scanner for Archimedes offering four monochrome resolutions (100, 200, 300 & 400 dpi) as well as having 4 different modes of operation to select gray scaled or monochrome images.
Software is fully integrated with the multi-tasking RISC OS and utilises the desktop environment to facilitate easy incorporation of scanned images into RISC OS compatible DTP, Wp, art or drawing package.
The scanning area is 4" wide and vertical height is limited only by memory constraints. The image brightness is adjustable to obtain the optimum quality. Tone selector allows different settings for text and photos.
Software appears as an icon on the icon bar from where all its facilities can be accessed. Software features include:
Visual rescaling of either X or Y axis, X & Y flips, colour tinting, picture cropping, on screen help, etc. RISC OS's anti aliaising feature is utilised to enhance the image quality.
Scanned images can be saved as sprite file or dragged into other applications. The images can be output to compatible printer as a sprite using one of the RISC OS versatile printer drivers.
The manual is written in easy to follow style with hints and tips for getting the best results. The manual together with interactive on-screen help gets you going almost immediately you have installed the scanner. On screen warning appears if the image is being scanned too fast. Real time scanning would normally be used to setup the various controls for the best results and then off screen scanning would be carried out for the final scan to ensure uneven scanning speed does not leave tell-tale lines of lost data on the image.

***techno*SCAN complete with interface card and manual** **£149(b)**

GENIUS DIGITISING TABLET

Latest model of Genius GT1212A PC tablet adapted for use with Archimedes offers resolution of 1000 lines/in over a 12" × 12" working area and connects through the serial port of the computer.
Tablet is supplied with a four button puck controls, an optional two button stylus with switched tip is also available.
The software to drive the tablet is supplied as a module to operate within the RISC OS desktop environment. Once loaded several commands are available to control the tablet, ie commands to turn it on or off, to select relative or absolute coordinates etc. Three puck buttons act as standard mouse buttons and the fourth allows, special operations like changing the size of the tablet work area.
The tablet can virtually take over all the functions of a mouse making the use of graphics packages much simpler. The option stylus will make tracings, line drawings etc much easier and more accurate.

GT1212A Tablet	**£259(a)**
Optional Stylus	**£35(d)**

DISCS

3M 3.5" DS (10)	**£9(d)**

MULTIPOD PROFESSIONAL

Professional design and use of latest hardware/software technology have enabled this five function podule to provide the highest quality performance at economical and realistic price. The five functions are:
FAST-SCAN VIDEO DIGITISER: Offers the highest resolution and number of picture levels of any video digitiser for the Archimedes computers. Capable of digitising in any mode to 640 × 512 pixels with 256 grey levels. Colour can be digitised with a camera and filters. Software operates within Desktop and offers contrast/brightness control, zooming, grey scaling and sprite saving.
SOUND DIGITISER: Samples for sound frequencies from 4KHz to 80KHz can be manipulated, composed and saved. Editing functions include filtering, mixing, overlaying, swapping, cut/paste. Saved sound modules including stereo sound samples can be used in various applications including games or can be exported to other sound packages. Operates within desktop environment.
SERIAL PORT: A full RS232 implementation of a dual channel comms port. It is IBM compatible using a 25way D connector. Uses *FX and SYS calls.
JOYSTICK PORT: As BBC B analogue port, uses ADVAL commands.
ROM SOCKETS: 3 ROM sockets for use through built in BBC B RFS.

MULTIPOD PROFESSIONAL **£117(b)**

EXPANSION SYSTEMS

RISC OS (305/310/440)	**£29(b)**
RISC OS Prog Ref Manual	**£79(b)**
Econet Module	**£49(c)**
Ethernet Card for R140	**£449(b)**
Floating Processor Unit	**£599(b)**
Arc Prototypin Board	**£35(d)**
Tracker Ball for Arc	**£59(c)**

RAM UPGRADES

1Mb RAM upgrade (A3000)	**£179(b)**
1Mb RAM upgrade (410)	**£140(c)**
2Mb RAM upgrade (420)	**£273(b)**
3Mb RAM upgrade (410)	**£375(b)**

FLOPPY DRIVE UPGRADE

3.5" Int Drive (305/310/410)	**£118(b)**
External Drive Adaptor (300/400)	**£30(c)**
External Drive Adapator (3000)	**£30(c)**
External 5.25" Drive 40/80T, psu	**£90(b)**

I/O UPGRADES/EXPANSION

Acorn Backplane (2 slots)	**£37(c)**
TechnoLog Backplane (4 slots)	**£39(c)**
Fan for TechnoLog Backplane	**£8(d)**
I/O Podule	**£80(c)**
Midi Expansion Card	**£66(c)**
Midi Add-on to I/O	**£37(c)**
Acorn ROM podule	**£51(c)**
CC ROM Podule	**£45(c)**
IEEE Interface Card	**£283(b)**
16 bit parallel I/O Card	**£195(b)**
Dual RS232 Card	**£195(b)**
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HARD DRIVES & CONTROLLERS

Acorn 20Mb HD + Controller (310)	**£379(a)**
Techno HD Controller for 2 HD (310)*	**£209(b)**
SCSI HD Controller	**£299(a)**

Internal ST506 drives for 410 supplied complete with mounting bracket, cables & instructions

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Techno 20Mb 28 ms	**£199(a)**
Toshiba 40Mb with Auto park 25 ms	**£329(a)**
Techno 40Mb 28 ms	**£299(a)**
Techno 49Mb 28 ms	**£369(a)**
External ST506 HD as 2nd HD	
20Mb (cased & psu, cables)	**£249(a)**
40Mb (cased & psu, cables)	**£359(a)**
49Mb (cased & psu, cables)	**£439(a)**

Enquire on prices for SCSI drives

CABLES

Arc BBC Serial Link inc software	**£15(d)**
Arc BBC Serial Cables	**£7(d)**
Arc PC Serial Cables	**£7(d)**
Arc Parallel Printer Lead	**£7(d)**
Arc Keyboard Extn Lead	**£7(d)**
Arc Scart Lead	**£7(d)**
Arc/CM8833 lead with auto jack	**£10(d)**
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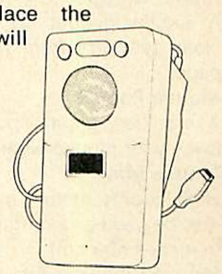
AEDA

External Drive Adaptor: A versatile external drive adaptor offering many novel features:
Professionally designed for easy and neat installation.
Fully buffered and handles a total of 4 drives (3.5" or 5.25").
Rear panel mounted to switch to select internal or external drive as boot drive. Particularly useful with PC programs.

AEDA for 300/400 Series	**£30(c)**
AEDA for A3000 (1 rear plate)	**£30(c)**

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A sturdy, high quality tracker ball is now available to replace the Archimedes mouse. You will no longer run off your mouse mat and at the same time you can save the valuable desk space. The tracker ball is fully compatible with the Arc mouse driver. **£52(c)**



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BBC Master Computer the most popular computer for education comes complete with a WordProcessor and Spreadsheet and fun/primary education packages.

BBC Master 128 with Acorn Colour Monitor, TS400 Single Drive & Epson LX400 printer	**£715(2*a)**
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We can also offer systems to suit your specific requirements. Low cost finance available on above systems.

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Stacking Filestore EOIS	**£899(d)**
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Filestore Hard Disc E60S	**£1079)a)**
Econet Starter Kit	**£85(b)**
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Econet Bridge	**£174(b)**
Printer Server Rom	**£41(d)**
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Master FS Utility Disc	**£17.25(d)**

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2nd Internal Drive	**£95(b)**
Serial Port Kit	**£26(d)**
External Drive Adaptor	**£9(d)**
Parallel Printer Lead	**£7(d)**

UPGRADES FOR MODEL B

Acorn 1772 DFS Kit	**£49(d)**
ADFS ROM	**£26(d)**
BASIC II ROM	**£22(d)**
ATPL ROM/RAM Expansion Board	**£37(c)**

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ADC06 Turbo 65C102 CoProcessor	**£115(c)**		
ADF10 Econet Module	**£49(c)**	Acorn Rom Cartridge	**£13(d)**
ADJ22 Ref Manual I	**£14(c)**	ADJ23 Ref Manual II	**£14(d)**
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Universal CoProc Adaptor	**£49(b)**		
BBC Domesday System	**£2,500(2xa)**		

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A handy gadget to obtain clean tear-offs from fan fold paper **£4.50(d)**

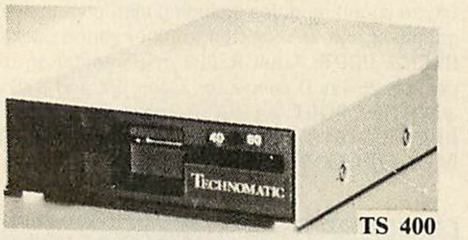
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A moulded plastic pocket to lock away your mouse when not in use **£4(d)**

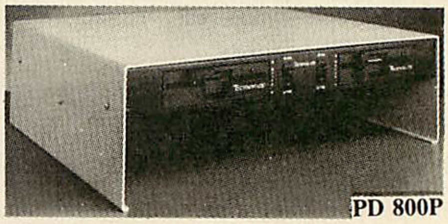
Mouse Mat
High quality mouse mat which can also be used as a cutting pad (scales in inches and cm) **£3.50(d)**

Mouse Cleaning Kit
An essential kit to ensure your mouse remains in perfect trim and provides precise operation **£4(d)**

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A range of high quality high performance drives to meet the needs of all BBC Micro Users.
*All drives are fited with high quality slim line ultra lower power mechanisms capable of single and double density operation and offering fast track access and head setting times.
*5.25" floppy drives are fitted with 40/80 track switches as standard at no extra cost. The switches are located in the front and clearly marked to indicate the status at a glance.
*All drives fitted with all necessary leads and are ready for operation on unpacking. The drives with the mains power supply are supplied with a mains lead fitted with a suitably fused 13A moulded plug.
*Our plinth drives have been thoughtfully designed and provide a choice of two 5.25" drives or a combination of 5.25" and 3.5" drives.





5.25" Single Drives 40/80 switchable:

TS400 400K/640K	**£80(b)**
PS400 400K/640K with integral mains power supply	**£90(b)**

5.25" Dal Drives 40/80 switchable:

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PD800 800K/1280K with integral mains power supply	**£170(a)**
PD800P 800K/1280K with integral mains power supply and monitor stand	**£185(a)**
PD800 Case with psu & data cable	**£42(b)**
PD800P Case with psu & data cable	**£75(a)**

PS400/PS351 are Compact/Archimedes compatible.
PD800/PD352/PD853 are Archimedes compatible.

3.5" 80T DS Drives

TS351 single 400K/640K	**£69(b)**
PS351 3.5" single drive with integral mains power supply in a 5.25" case.	**£95(b)**
TD352 Dual 800K/1280K	**£126(a)**
PD352 3.5" dual drive with integral mains power supply in a 5.25" case.	**£139(a)**

Combo Drives (5.25" & 3.5" drives)

PD853	**£185(a)**
PD853 psu and plinth mounting	**£205(a)**

DISC DRIVE MULTIPLEXER
For Master, B, B + and any DFS/ADFS

TDM2 Two computers/one drive unit	**£65(b)**
TDM4 Four computers/one drive unit	**£115(b)**

WINCHESTER DRIVES

Most popular range of Winchesters for BBC. Drives are housed in metal casing fan cooled and powered by switch mode psu for quiet, efficient and reliable operation.
Front end utility for Master, format and verify program and Tree Plan directory structuring utilities are included as standard.

P30HD drive	**£399(a)**
P60HD drive	**£529(a)**
P304HD + 40/80T DS Floppy	**£529(a)**

3M FLOPPY DISCS

5.25" Discs in packs of 10

744 40T SSDD	**£5(d)**
745 40T DSDD	**£6.50(d)**
747 80T DSDD	**£9(d)**
3.5" DSDD Discs	**£9(d)**

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50 5.25" 40T single sided discs with sleeves in lockable box.	**£20(b)**
50 5.25" 80T double sided discs with sleeves in lockable box.	**£25(b)**
40 3.5" 80T DS Discs in lockable box	**£38(b)**
Drive Head Cleaning Kits (5.25" or 3.5")	**£4(d)**

STORAGE BOXES

Library Cases:
10 × 5.25" **£11(d)** 10 × 3.5" **£1(d)**

Lockable Boxes;

3.5": 40 Discs	**£6(c)**	80 Discs	**£7(c)**
5.25": 50 Discs	**£6(c)**	70 Discs	**£7(c)**
	100 Discs	**£8(c)**	

SPARE PARTS

BBC B/B+ Power Supply	**£65(b)**
BBC B Keyboard	**£52(b)**
BBC B Keyboard Connector	**£4.75(d)**
BBC B/B+ Video ULA	**£18(d)**
BBC B/B+ Serial ULA	**£12(d)**
KeySwitch B,B+, M (please specify original type)	**£1.75(d)**
UHF Modulator	**£4(d)**
16Mhz Xtal	**£2.50(d)**
17.734 MHz Xtal	**£2.50(d)**
6502A	**£5.50(d)**
4816 RAM (B)	**£2(d)**
Master psu	**£59(b)**
Master Keyboard	**£62(b)**
Keyboard Connector set (M)	**£5(d)**
1Mb OS ROM M	**£39(d)**
CF30060 ULA (M)	**£10(d)**
CF30047 ULA	**£15(d)**
ULA (512)	**£34(d)**
ULA (6502 & Z80 2nd Proc)	**£28(d)**
Power Supply (2nd Proc)	**£42(b)**
ARC Keyboard Assy	**£85(c)**
ARC Power Supply	**£65(b)**
Mouse	**£49(c)**
Drive Cable	**£5(d)**
Keyboard Curly Cable	**£22(c)**
Window Moulding	**£6(d)**
41464	**£8(d)**

If the parts you need are not listed please call us

TIME WARP

Provides real time and date information. Time Warp with battery back up fitted as standard simply plugs into the User Port. Demo Software on Disc includes a diary/planner application. **£29(d)**

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(d) £1.00

PRINTERS & PLOTTERS

EPSON

Epson LX/FX
Epson's budget priced 9 pin printers offer quality and reliability with Epson's advanced paper handling technology, draft and NLQ print in variety of typestyles and fonts:

LX400 180cps draft 30cps NLQ **£139(a)**
LX850 200cps superdraft 30cps NLQ **£189(a)**
FX850 264cps draft 54cps NLQ **£309(a)**
FX1050 as FX850 but wide carriage (132 col) **£379(a)**

Epson LQ range
Epson's 24 pin printers with superior draft and letter quality, variety of typestyles and fonts, high res graphics, advanced paper handling and Epson's reliability:

LQ400 180cps draft 60cps LQ **£209(a)**
LQ550 180cps draft 60cps LQ **£259(a)**
LQ850 264cps draft 88cps LQ **£409(a)**
LQ1000 200cps draft 67cps LQ (132 col) **£469(a)**
LQ1050 as LQ850 but wide carriage (132 col) **£529(a)**

Epson Colour Printers
High speed 9 and 24 pin printers with colour option fitted:

EX800 300cps draft 60cps NLQ **£429(a)**
EX1000 as EX800 but wide carriage (132 col) **£549(a)**
LQ860 as LQ850 but with colour **£529(a)**
LQ1060 Wide carriage version of LQ860 **£649(a)**
LQ2550 400cps draft 133cps LQ **£899(a)**

Epson Inkjet/Laser Printers
SQ850 600cps draft 198cps LQ **£629(a)**
SQ2550 as SQ850 but wide carriage (132 col) **£929(a)**
GQ5000* Laser 6ppm multifont **£1150(a)***
**(Free 12 months on site maintenance included in the price)*
DFX5000 9pin Hi Speed Line printer 533cps **£999(a)**

NATIONAL PANASONIC

KXP1081 + Master Printer Lead **£135(a)**
KXP1124 24 pin 190cps draft 63cps LQ **£245(a)**
KXP1540 24 pin 240cps draft 80cps LQ 132 col **£435(a)**

STAR

LC10 9 pin 144cps draft 86 cps NLQ **£139(a)**
LC15 as LC10 but wide carriage (132 col) **£289(a)**
LC10 Colour version of LC10 **£179(a)**
LC24-10 24 pin 180cps draft 60cps NLQ **£219(a)**
LC24-15 Wide carriage version of LC24-10 **£349(a)**
NB24-10 **£409(a)**

TAXAN

KP815 180cps draft 25cps NLQ **£149(a)**

INTEGREX

132 Inkjet Colour Printer **£515(a)**
Colourcell Inkjet Printer **£2750(a)**

HEWLETT PACKARD

Laserjet Series IIP **£849(a)***
Laserjet Series II **£1279(a)***
Deskjet Plus **£529(a)**
Paintjet **£659(a)**
**FREE 12 months on site maintenance contract included*

PLOTTERS

Hitachi 673 A3 4 pen **£439(a)**
Plotmate A4S **£379(a)**
Plotmate **£549(a)**

ROLAND A3 8 pen FLATBED PLOTTERS
DXY880A **£510(a)** DXY1100 **£625(a)**
DXY1200 **£839(a)** DXY1300 **£1025(a)**

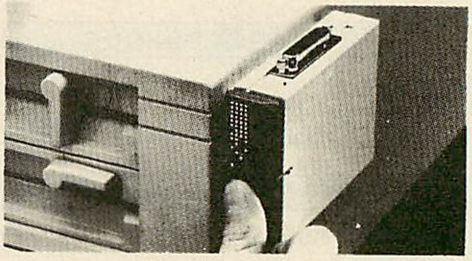
BUFFERS & SHARERS

256K Auto Sharer/Buffers
This smart 256 buffer allows 2, 4 or 8 computers to share one printer. Auto scanning monitors input ports and downloads data into buffer, freeing the computer for other use. Buffer expandable to 1Mb. 25 way D female connectors.

PBS21/256 2 input 1 output **£149(b)**
PBS41/256 4 input 1 output **£199(b)**
PBS81/256 8 input 1 output **£289(b)**

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256K parallel buffer with facilities for 256 copies, PAUSE, RESET & SELF-TEST **£149(b)**

Compact Two Way Switch
An economical solution for connecting two computers to one Printer or one computer to two printers. Easily attaches to the side of computer or monitor (specify parallel or serial) **£19(c)**



Manual Printer Sharers:

(All lines are switched).	Parallel	Serial
2 computers to one printer	£23(c)	£23(c)
3 computers to one printer	£30(c)	£30(c)
4 computers to one printer	£36(c)	£36(c)
2 computers to 1 or 2 printers	£49(c)	£49(c)

Cable sets for above sharers available for all popular computers

BBC Computer Sharer: TCS26
1 computer to 2 printers fitted with BBC cable **£15(c)**

Parallel Printer Leads
BBC/Master (1.2m) **£5(d)** BBC/Master (2m) **£7(d)**
Archimedes (2m) **£7(d)** Compact (1.2m) **£7(d)**
Nimbus 2m **£7(d)**
36/36way centronics (2m) **£9(d)**
IBM/PC Compatible (2m) **£7(d)**

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Plain fanfold *woodfree* paper with microperforations:
2000 sheets: 9.5″ x 11″ 60gsm **£11(b)**
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A4 90gsm **£12(b)**
500 Loose A4 sheets **£4(c)**
50 sheets Art paper 115gsm A4 **£3(c)**, A3 **£5(c)**
Integrex Paper Roll Std: **£7(d)**
High Quality: **£16(d)**

Labels/1000
Single Row 3½ x 1 7/16″ **£5(d)**
Double Row 3½ x 1 7/16″ **£5(d)**
Triple Row 2 7/16″ x 1 7/16″ **£5(d)**

PRINTER ACCESSORIES

Serial Interfaces
Epson 8143 **£32(d)**
Nat Pan KXP17 **£39(d)**
Epson8148(8Kbuffer) **£79(d)**
Taxan **£49(d)**

Buffers
32K Buffer IC for P1124/1540 **£18(d)**

Cut Sheet Feeders:
LX400/800/850, LQ400/550 **£69(b)**
FX800/850, LQ800/850 **£135(a)**
LC10 **£55(b)** LC24-10 **£89(b)**
Brother HR20 **£209(a)**
KXP1124 **£88(b)** KXP1540 **£179(a)**

Full Tractor Feeds:
LQ800 **£49(b)** LQ1000 **£55(b)**
LQ850 **£70(b)** LQ1050 **£85(b)**

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A new style printer stand with easy paper feed and paper seperation, provides complete access to paper. Can be used with both top and bottom paper feed. Very space efficient. **£22(b)**

Guaranteed High Quality Ribbons

Epson:
LX80/86/800,400/850 **£3.50(d)**
MX/RX/FX80/85/800/850 **£3.50(d)**
MX/RX/FX100, FX105/1000/1050 **£5(d)**
LQ400/550/800/850 **£4.50(d)**
LQ1000/1050, EX800/1000 (Black) **£7(d)**
EX800/EX1000 Colour **£15(d)**

Star:
LC10/NL10 **£3.50(d)** LC10 Col **£5(d)**
LC10 Colour **£6.50(d)**
LC24-10 **£5.00(d)**

National Panasonic
KXP1081 **£3.50(d)** KP1124 **£6(d)**
Taxan KP810/815/910/915 **£5.00(d)**
Juki 6100 **£1.80(d)**
Integrex Black Cartridge **£10.50(d)**
Integrex Colour Cartridge **£16(d)**

Plotter Pens:
Epson HI80 4 pen set (water/oil) **£7.50(d)**
Hitachi 672 6 pen set: water **£18.50(d)**
Oil **£25(d)**
Roland 4 pen set. (water/oil) (various sizes) **£7.50(d)**
EX800/EX1000 Colour Kit **£15(c)**

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MIRACOM WS4000 V21/V23 **£115(b)**
MIRACOM WS3000 V22 **£275(b)**
MIRACOM WS3000 V22bis **£395(b)**
PACE LINNET V21/23 **£129(b)**
Termulator (B/B+) **£25(d)**
Termulator (M) **£35(d)**
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All models carry a BABT Approval

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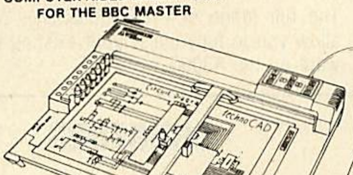
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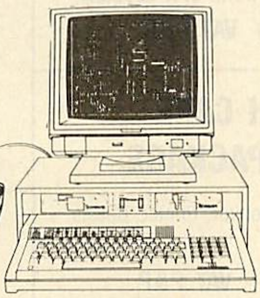
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COMPUTER AIDED DRAUGHTING FOR THE BBC MASTER





- ★ An easy to use CAD system with pop up menus providing a user friendly interface at all stages of operation.
- ★ Input can be configured for keyboard, mouse or tracker ball. Only three keys to input all commands if input from keyboard.
- ★ Virtually no limit to the size or complexity of the drawing that can be created. Powerful zoom facility allows a A0 size drawing to be viewed from single screen or a single screen can be enlarged to A0 size. Continuous panning across a drawing by specifying co-ordinates.
- ★ Lines, arcs and circles can be drawn with ease and in user defined colour and thickness. These can be modified at any stage of drawing.
- ★ User definable grid and scale, together with on screen display of dimensions, and co-ordinates enable easy and accurate drawings.
- ★ Multi layering capability with 8 levels allows superimposition of drawings.
- ★ Powerful icon utility allows any shape or drawing to be saved to a library as an icon. Icons can be recalled from the library and placed anywhere on the screen drawing at required scale and orientation.
- ★ Toolkit program allows customisation of files, utilities and peripherals.
- ★ Drawings can be scaled on screen to suit the plotter or printer in use. A maximum resolution of 0.01mm is available. Preconfigured drivers for many popular plotters and a driver generator for any BBC compatible plotter is included. Printer drivers for Epson 9 pin and 24 pin printers are included as standard as is the facility for installing drivers for other printers. Printers will output in landscape or portrait format.

WHY technoCAD

The best feature of technoCAD is not its outstanding performance, not its unique ability to allow creation of complex icons, not the quality of output from printers or plotters. The best feature is the unprecedented ease with which it can be mastered. With easy to use single key commands limited to three keys, pull down menus and a clear and concise, easy to read manual, technoCAD is truly the system any one can use.

techCAD will meet the needs of most professional applications and it is an ideal tool for teaching CAD in technical schools, CDT departments and colleges.

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£99(c)

NOVACAD
Computer Aided Draughting System

Novacad can drive a plotter to produce drawings of highest quality ... Novacad is excellent. It is flexible, genuinely easy to operate without much practice, and a pleasure to use. **Beebug Dec 86**

A sophisticated CAD package with unique facilities. Thousands of Novacad packages are being used in widely differing fields ranging from industries for producing engineering drawings to accountants' offices for producing flow charts. Architects, engineers, plumbers, kitchen planners and many other professions requiring easy to use facilities for producing high quality output are making extensive use of Novacad's unique features. Novacad is proving to be an invaluable teaching aid in technical schools simply because of the ease with which it can be used.

Novacad is compatible with all models fitted with Acorn DFS. Hardware requirements can be minimum; single drive and FX80 compatible printer are enough to get started, though its performance is enhanced considerably by use of 6502 2nd processor, dual drive and to a degree with B+ and Master's shadow ram.

The major features offered are:

- ★ Simple and easy to use with logical command sequence.
- ★ A large drawing area (approx 15 screens)
- ★ Unique ability to create complex icons made up of upto 500 lines instead of the usual 15 to 20 pixels, store them in a library and recall them at different scales and orientations.
- ★ Zoom facility.
- ★ Create multi level drawings.
- ★ Text entry at any 90° orientation anywhere on the screen.
- ★ Grid scaling and locking, displacement measurements.
- ★ Printer routine for FX80/100 compatible printers.
- ★ Cursor control from keyboard/tracker ball/mouse.

Plotter driver generator available as an optional utility, configures a routine for any BBC compatible plotter. Pre configured routines for popular plotters like Epson HI80, Hitachi, Plotmate are included. Drawings can be scaled to maximum plotter size.

NOVACAD T/M Version	£49(d)
NOVACAD T/M + Plotter DG	£61(c)
Plotter Driver Generator	£15(d)

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12", 14" and 20" MONITORS

Microvitec 1431 Std td Res, 14"	£175(a)
Microvitec 1431AP Std Res + PAL/Aud, 14"	£199(a)
Microvitec 1451 Med Res, 14"	£219(a)
Microvitec 1451AP Med Res + PAL/Aud, 14"	£255(a)
Microvitec 1441 Hi Res, 14"	£359(a)
Dust Cover for Microvitec 14" monitors	£5.50(d)
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Touchtec 501	£239(a)
Acorn Philips 14" Colour Monitor	£199(a)
Microvitec 2030CS 20" Standard Resolution RGB/Comp Video	£380(a)
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TAXAN SUPER VISION 625 12" Super Hi Res and contrast RGB Monitor with option to switch to mono BBC/IBM compatible.	£269(a)
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PHILIPS BM 7522 Hi Res amber screen	£79(a)
Tilt & Swivel Stand for Philips Mono	£6(c)

MONITOR ACCESSORIES

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Monitor Stand Master	£13(c)
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Microvitec Lead	£4(d)
Monochrome BNC/Photo Lead	£4(d)
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General purpose tilt and swivel stand for 12" and 14" Monitors	£12(b)

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AMIGA

A500 computer, mouse & modulator.

SPECIAL PRICE
£350.00 INC. VAT

A500 Tenstar Pack
+ 10 games and photon pack valued at over £200 pounds

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BATMAN PACK

AMIGA 500, includes Batman game, interceptor deluxe paint II, New Zealand-story gam. 10 other games and photon pack.

£399 INC. VAT

ATARI

ATARI 520 STFM computer explorer pack, mouse, 1 meg drive, game and tutorial disk

Basic ONLY £279.99 INC. VAT

ATARI 520 STF power pack computer, mouse, 1 meg drive, 21 games, organiser, software and joystick worth £458.97.

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ATARI 1048 STFM 1 megabyte memory, mouse, 1 meg drive VIP PRO; (spread sheet), microsoft-write, (word processor); superbase personal (data base) Basic (language). The value of software is £684.95

STAR PURCHASE*
£449.99 INC. VAT

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A3000 Starter Kit
A3000
Monitor (Colour)
With *FREE* Printer worth over £200.00

£925.00 + VAT P&P

HEALTH CARE A410/1 PACKAGE

20 Meg HD, Colour Monitor, Printer, Cables, Full Care Suite

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ARCHIMEDES	PRICE
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420/1	£1699.00
440/1	£2499.00

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with 1 Meg upgrade
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Calderglen offer a unique service: high on the teacher training for RISC-OS, also a complete training workshop for indepth instruction on all hardware including ECONET. Courses for familiarisation of ART & DESIGN PACKAGES, DTP, SPREAD SHEETS etc, take the uncertainty out of buying hardware and software packages. Try them first at CALDERGLEN. Free of charge.

ALSO AVAILABLE

The full range of Pres equipment. Which will allow you to fully utilise your existing BBC Software on the A3000.

MONITORS

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Philips	8832 colour	£179

FAX

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Other models available

PHOTOCOPIERS

Brother colour **£4995.00**

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Lockable	
40 Disc	£7.95
100 Disc	£9.95

ARCHIMEDES TELEPAD DIGITISER WITH MOUSE EMULATION AND STYLUS PEN BY CTS £374.00

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A3K6	Disc Buffer Board	£48.95
A3K8	3.5" Additional Floppy disc upgrade	**£75.00**
A3K9	Additional Floppy disc upgrade	**£99.95**
A3K12	65Host DFS and DFS Filer	
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Also available external podule expansion

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310	£899	£959	£1088	£1294
410/1	£1199	£1259	£1399	£1594
420/1	£1699	£1759	£1888	£2094
440/1	£2499	£2559	£2688	£2894

(Securicor carr. £10 on Archimedes)

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- Monitor Stand £22
- Twin Monitor Stand £–
- External Podule Case £14
- Serial Upgrade £19
- Dust Cover Micro only £4
- Micro + Monitor £7
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Offers on Archimedes Micro

When you purchase an Archimedes Micro from Watford, look what you get FREE with it

Micro	Free Offer
A310	A Real Time Video Digitiser worth £249
A410/1	Upgraded to 2MB RAM & a 20MB Hard Disc, worth £299 (A420)
A420/1	Upgraded to 4MB RAM & a 40MB Hard Disc, worth £679 (A440)
A440/1	A TAXAN 770+ Low Radiation Monitor
A3000	Upgraded to 2MB, worth £159

ACCESSORIES

- NEW Multitasking RISC OS £29
- MEMCI Upgrade £68
- ARM 3 Upgrade £575
- ROM Podule Acorn £45
- ROM Podule (Computer Concepts) £45
- ROM Podule (C C) with Battery Backup £59
- 2 Podule Backplane (Watford) £25
- 4 Podule Backplane (Watford) £35
- Backplane FAN only (for Hard Disc) £8
- 3.5" 800K 2nd Floppy Drive (305/310) £85
- 5.25" 800K external Floppy Drive £85
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- MIDI Expansion Card £65
- Sound Sampler Mono (Armadillo) £129
- Sound Sampler Stereo (Armadillo) £166
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- Archimedes IEEE Interface Adaptor £269
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- Arm Assembly Lang. Prog. Manual £15
- Archimedes BBC Basic Guide £20
- Keyboard Extension Lead £6

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Archimedes Special Upgrades

The impossible is now possible. Watford's Ram booster system adds more Ram to your Archimedes. Upto 2 and 4 Megabytes for A3000 and 2 & 4 Megabyte kits for the A300 & 400* series.
(* For A400 series we also supply low cost Hard Disc upgrades too.)

FREE RISC-OS
RISC-OS is certainly the most flexible and powerful operating system available on any personal computer. The new interface allows full and easy access to the power of the Archimedes. More importantly, RiscOs allows a number of programs to be executed simultaneously, so that you can transfer information between windows. But the lack of memory prevents you getting the most from Risc-Os, because the number of programs you can load is limited by the memory your computer has – even 1Meg is barely enough to fully utilise Risc-Os. Watford's RAM upgrades frees Risc-Os by giving it extra Ram it needs.

Runs the Most Powerful Software
New sophisticated Archi software is designed with 1 megabyte of Ram in mind. The innovative features of modern applications will mean that they are less likely to run on small memory computers. Even Acorn's own DTP software is severely compromised by memory shortage on such micros. Adding more Ram means that your Archimedes will be ready to run the most sophisticated and demanding of software.

Easy to Fit
Watford Electronics have pioneered Memory Expansion Technology so that you can install 1,2 or 4 megabytes of RAM upgrades without having to use anything more dangerous than a screwdriver. The RAM Expansion System for the A300 series is supplied on 2 cards which fit neatly inside and will not interfere with any other part of the computer. Using the special tool supplied, the cards simply drop into sockets on the mother-board, and connect with the ribbon cable supplied. That is all there is to it.

Archimedes RAM Upgrade

All our memory upgrades are simple to fit. No soldering required.

- A3000 Watford 1MB RAM Upgrade £129
- A3000 Watford 4MB RAM Upgrade £349
- A305 0.5 Meg RAM Upgrade £99
- A305/310 2Meg RAM Upgrade £285
- A305/310 4Meg RAM Upgrade £499
- A410/1 RAM Upgrade to 2 MB £109
- A410/1 RAM Upgrade to 4 MB £319

(Carriage on Add-ons £3)

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Watford Electronics' 20Meg & 40Meg hard disc fits internally into the Winchester slot provided.
It is fully compatible with Acorn's hard disc upgrade, (the only difference is our low price). Price includes the Hard Disc Drive, Controller Podule & fitting instructions.
P.S. The 310 upgrade requires a backplane and a fan.

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- 3HD40 – 40Meg H' Disc + Podule for 310 £439
- 2 Podule backplane (Watford) £25
- 4 Podule backplane (Watford) £38
- Fan for the backplane £8
- 4HD20 – 20 Meg Hard Disc for 410 £169
- 4HD40 – 40 Meg Hard Disc for 410 £285
- A3000 Hard Disc Podule only £195
- A3000 20 Meg Hard Disc £369
- A3000 40 Meg Hard Disc £489

(Carriage £7)

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Acorn's Archi DTP Package £125
Impression DTP Package £135

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UP20	2MB RAM + 20MB Hard Disc	£425
UP30	3MB RAM + 40MB Hard Disc	£569
UP40	3MB RAM + 53MB Hard Disc	£669

(P.S. When purchased with an A410/1, the upgrades will be fitted at no extra cost)

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Wordwise + Disc	£17	Pipedream	£89
Image Writer	£25	P.Spellchecker	£40
Interword ROM	£35	View	£45
1st Word Plus	£71	Viewspell	£32
Archie Spell Master	£39	Viewindex	£12
Pipedream 3	£125	Graphic Writer	£23

DATABASES

AlphaBase	£36	Flying Start II	£77
Viewstore	£45	System's Delta +	£55

SPREADSHEETS

Intersheet ROM	£35	Viewsheet	£45
Sigmasheet	£55		

BUSINESS GRAPHICS

GammaPlot	£50	Interchart Disc	£17

INTEGRATED PACKAGES

Logistix – Database, Spreadsheet, Time Management & Business Graphics £89
Pipedream 3 – Wordprocessor, Database & Spreadsheet £125
(P&P on above £2)

GRAPHICS, ART, DESIGN & GAMES

GRAPHICS			
Atelier	£84	E-Type Designer	£15
Artisan II Disc	£49	Freddy's Folly	£10
Pro Artisan	£140	Holed Out Designer	£17
Archeffect	£20	Holed Out Golf	£17
Autosketch	£69	Hyperpack (12)	£79
Autosketch II	£75	Hoverbod	£11
Gamma Plot	£60	Ibix the Viking	£14
Graph Box	£64	Inter Dictor	£25
Kermit	£46	Jet Fighter	£10
Lingenuity Presenter	£24	Minotaur	£11
Render Bender	£59	Missile Control	£11
		Orion	£12
		Pacmania	£14
		Repton 3	£17
GAMES		Thundermonk	£11
3D Pool	£17	Zarch	£15
Alerion	£11	**Miscellaneous**	
Arcade Soccer	£17	Arc TFS	£25
Clares 3 Pack	£12	Toolkit (Beebug)	£32
Conqueror	£19	Toolkit (Clares)	£42
Enthar Seven	£22	Hearsay Comms Pack	£55
E-Type	£17		

COMING SOON

A3000 Podule expansion racking system to accept all existing Archi 310 & 410 podules

LANGUAGES (Archimedes)

ISO-PASCAL; FORTRAN 77	£86 each
ANSI C Release 3	£139
Assembler; LISP or Prolog X	£155 each
LOGOTRON LOGO	£55
ROBO LOGO	£56
RISC BASIC	£85
BASIC Compiler	£89
TWIN EDITOR	£25

(P&P £2 on above packages)

MINERVA's Archimedes Software

Sigmasheet	£55	Sales Ledger*	£53
Home Accounts*	£40	Purchase Ledger*	£53
Stock Manager*	£53		
Nominal Ledger*	£53	Reporter	£29
Ancestry	£59	Mailshot	£29
Gammaplot	£50	MultiStore	£249
System Delta+	£55		

System Delta + Reference Manual	£25
Order Processing/Invoicing*	£53
School Administrator	£99

** Requires System Delta*
(P&P on above items £2)

Archimedes to BBC Serial Link Mk 2

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers.

New RISC OS Version **Only £15**

Archimedes 5.25"/3.5" Disc drive Interface

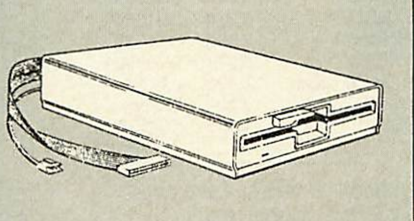
With this interface it is possible to connect almost any 5.25"/3.5" disc drive with its own power supply to the Archimedes. Upto 4 disc drives can be connected. NO SOLDERING is involved. Supplied complete with necessary lead.

Only £21

BBC MASTER

MASTER 128K Micro incl. Acorn's View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus FREE OFFER (see below) **£439** *(carr £7)*

FREE OFFER



A 5.25" Double Sided, 40/80 track switchable 400K Disc Drive complete with cables and a Utilities disc incl. 2 games, plus

Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control.
FREE with every BBC Master purchased from us during January

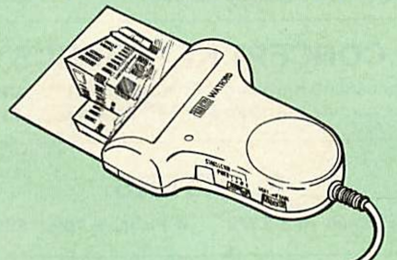
ADD-ONs & ACCESSORIES

Turbo 65C102 Add-on Module	£115
Econet Module for the Master	£47
Twin ROM Cartridge for Master	£8
Quad ROM Cartridge for Master	£12
Master Reference Manual I	(No VAT) £14
Master Reference Manual II	(No VAT) £14
Master Advance Ref Manual	(No VAT) £17
64K Upgrade Kit for B+	£32
Acorn 1772 DFS Kit complete	£49
ECONET Upgrade Kit for BBC B	£42
ALL ECONET UPGRADES Available	
ARIES' IEEE Interface for BBC B & Master	£238
Morley Teletext Adaptor with ATS Rom	£99

Filestore E01S	£899	Filestore E40s	£799
Filestore E60S	£1080	Ecolink	£270

(Carr. £2 to £7 depending on the weight)

Archi Mk II Hand Scanner



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system. The package includes the most comprehensive utility software available for the Archimedes, a high quality, ergonomically designed to fit the shape of your hand, (see drawing above) scanner, which is fitted with a warning LED that will indicate if the scanner is being moved too quickly for accurate results. Additional twin guide rollers ensure precise tracking over the image, to make the best use of the high resolution available with this sytem. The yellow/amber illumination of our Mk II scanner, enables you to achieve optimum accuracy. It is capable of scanning upto an amazing 400 DPI. The scanning area is 4" wide and the height is only limited by the maximu amount of memory available.

On board ROM software supplied, is the most sophisticated Archimedes scanner software yet written.

Launch offer £149 (P&P £4)
(Please write in for technical details)

Z88 Portable Micro



Watford Electronics are the largest Z88 Dealer in the UK

Only: **£195** (Carr £4)

FREE

With every Z88 purchased from us this month, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

ACCESSORIES

32K RAM Pack or 32K EPROM Pack	£18.00
128K RAM Pack or 128K ROM Pack	£45
512K RAM Pack	£175
Z88 Eprom Eraser Unit	£35
Z88 Spellmaster for Pipedream	£51
Z88 Carrying Case	£9
Z88 Computing Book	£9.95
AA Nicad Rechargeable Battery	£1.50
Battery Charger Compact & Fast	£6
Z88 Serial Printer Cable	£9
Z88 Parallel Printer Cable	£25

● Z88 to BBC Link	£20	● Z BASE	£56
● Z88 to PC Link II	£30	● Z TAPE	£42
● Z88 to Macintosh	£52	● Z TERM	£42
● Z88 Mains Adaptor	£9	● Z88 Modem	£149
● Z88 to Archimedes Link	£TBA		

By popular demand, we are now supplying refurbished and fully guaranteed BBC Micros with Disc Filing System
(Please telephone for price & availability)

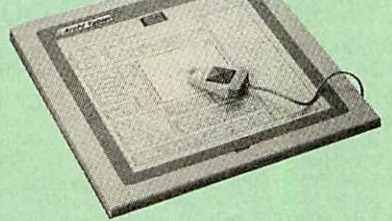
FINANCE AVAILABLE

In these days of expensive borrowing, we are pleased to have negotiated a special low rate finance deal for our customers, with flat interest rate of 12.25% per annum, typical APR 25.5%.

In addition to the above, we are able to offer all Archimedes and BBC Master computers as well as selected hardware on a 0% interest free finance deal.

For further details please telephone: 0923 37774 ext 223/203/201.

Archi Graphic Tablet



This package allows Archimedes users to take advantage of the low cost graphpad (sometimes called a digitiser tablet, but not to be confused with a video digitiser!)

The Archi Graphpad offers performance and accuracy comparable to other graphics tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely.

The software, which is in the form of a relocatable module (RM), intercepts the system calls which control the mouse, and so allows virtually all mouse based Archimedes software to be controlled using the tablet without any modification. The only exceptions are programs which use the serial port, as the tablet is physically connected to this port itself.

Graphics programs such as Artisan, Pro Artisan, AutoSketch, Oak DTP, and the RiscOS Draw, Paint and DTP packages are considerably enhanced by the use of the graphics table as opposed to the mouse, although it can, of course, be used with any other mouse driven application.

The software allows the user to define how much of the tabler's 12" x 12" working area to use, allowing very fine control when drawing freehand or tracing from a variety of differently sized drawings, diagrams, photographs, etc.

The tablet driver is compatible with all Archimedes machines, and with both Arthur and RiscOS operating systems.

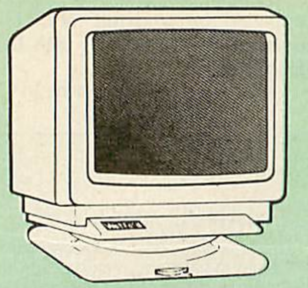
The pointer is moved via a four button puck complete with transparent lens and crosshairs for optimum accuracy. Three of the buttons emulate the Archimedes mouse buttons precisely, the fourth being used for special functions such as setting the position and size of the active working area. The buttons may be remapped to allow the relationship between tablet and mouse buttons to be redefined, should this be required.

The software is supplied with a special adaptor lead to connect the tablet to the Archimedes' serial port, and a power lead which plugs onto the Archimedes' main board.

Special Price £249 (carr. £4)
(Price includes Tablet, Leads & Software)
Stylus Optional Extra **£29**

Continued→ → → → → → → → → →

MONITORS



MICROVITEC 14"

- **1431** – Standard resolution as used on the BBC television computer programme £175
- **1451** – Medium resolution, suitable for word processing in mode 0 £219
- **1455** – MS Medium resolution, ideal for Archimedes £220
- **1441** – High res, exceeds the capabilities of the BBC Micro £359
- **1431AP** RGB + PAL and AUDIO £199
- **1451AP** RGB + PAL and AUDIO £255
- **2030 CS** 20" Med Res £380
- **2040 CS** 20" Hi Res £675
- Dust Cover for Microvitecs £5.50
- **Touchtec 501 Touch Screen** £239

14" MULTISCAN COLOUR

- **TAXAN** Multisync 770 Plus £389
- **TAXAN** 770 LR Low Radiation, autoscanning Ultra High Res £415
- **TAXAN** Multiscan 870 16" Monitor £575
- **TAXAN** Viking 19" Paper White, High Resolution (1152 x 896 with Archi 400 series) £799
- **EIZO** 8060H – For technical info. read the review in Micro User, Jan. '89 £389
- **EIZO** 9060S Super High resolution multiscan monitor for a wide range of applications. 800 dots x 600 lines. Display for high res VGA. 0.28 Dot pitch £469

TAXAN 12"

- Super Vision 3 – **Type 625** Super Hi-res RGB Colour, Green/Colour Switch £269

PHILIPS

- **BM7502** 12" Hi-res Green Monitor £64
- **BM7522** 12" Hi-res Amber Monitor £68
- **CM8833** 14" Med. Res Colour Monitor £189

STAR BUY

- **PHILIPS 14"** Medium Res, dark glass, attractively finished Colour Monitor – supplied complete with RGB, SKART and Audio/Phono Inputs. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £185

Dust Cover for Philips Monitors £6
(Securicor carriage on Monitors £7)

SWIVEL BASES

By simply placing your monitor on one of our front adjustable professional swivel bases (see drawing at the top), you can easily adjust the monitor viewing angle.

for 12" Monitors **£8** (carr. £2.50)
for 14" Monitors **£12** (carr. £2.50)

Anti Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for wordprocessor users.

Price £12

SPARE LEADS

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3
Archimedes Colour Monitor Lead	£7.50

CONCEPT KEYBOARDS

Standard A3 Keyboard with BBC Software	£143
Standard A4 Keyboard with BBC Software	£117

PLOTTERS

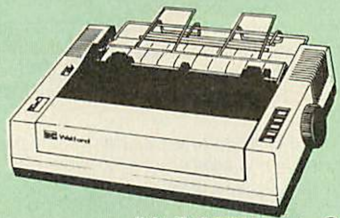
- Plotmate A4S £379
- Plotmate A3M £549

Roland Plotters

(Official Roland Appointed Distributor)

- **DXY 880A** £499
- **DXY 1100** £615
- **DXY 1200** £835
- **DXY 1300** £1015

Panasonic KX-P1081



SALE OFFER only: **£127**

(Price includes, FREE a 4ft Printer Lead, and a Dump Out 3, Screen Dump ROM worth £35 with every printer purchased from us)

KX-P1180 Printer Offer

Panasonic KX-P1180 printer, Dump Out 3, Screen Dump ROM & a BBC printer lead.

Offer Price £136

Panasonic Printers

- **KX-P1124** 24pin 80col. 192/63 CPS £225
- **KX-P1180** 9pin 80col. 144/38 CPS £146
- **KX-P1540** 24pin 136col. 240/80 CPS £435
- **KX-P1592** 9pin 136col. 216/45 CPS £275
- **KX-P1595** 9pin 136col. 288/61 CPS £355

- **Panasonic KX-P4450i** LASER PRINTER Latest technology at Watford's special offer price £1,325
- Spare Toner £29
- A4 Feeder £55
- Drum Unit £149
- Developer £115
- 1MB RAM Board £299

Panasonic Accessories

Cut Sheet Feeders

KX-P1592/1595 (P32)	£175	KX-P1540 (P35)	£175
KX-P1124 (P36)	£85	KX-P1180 (P37)	£79

BUFFERS

P12 4K buffer Board for 1081	£55
P42 32K buffer Chip for 1592/1595	£16
P43 32K Buffer Chip for 1540/1124	£16

Serial Interfaces

P17 P1081/1592	£32	P19 P1124/1180	£55

Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110 for KX-P1081, 1592 & 1595	£8
P115 for KX-P1180	£8
P145 for KX-P1124	£8
P140 for KX-P1540	£10
Colour Ribbons for KX-P1081, 1592 & 1595 Brown, Blue or Red	£9.95 each

INTEGREX COLOUR JET

- Colour Jet 132 Printer £515
- Paper Roll £6.50
- Screen Dump Software £10
- Colour Cartridge £16.50
- Black Cartridge £10.35
- 100 A4 OHP transparencies £55
- 8K Serial Interface Optional £123

NEW – Intergrex COLOURCEL NPQ Ink Jet Colour Printer £2,695

NEC P2200 PINWRITER

24 pin; 80 column; 168CPS – 56CPS LQ; Epson LQ compatible, 7K Buffer; 7 resident FONTS, Friction & Tractor feed, front load single sheet feed, etc.

£225

Pinwriter Serial Interface (optional)	£55
P2200 Cut Sheet Feeder	£59
Additional Font Cartridge	£25

NEC PINWRITER P6/P7 Plus

NEC P6+ 80 columns	**£439**	**NEC P7+** 136 columns	**£575**
Colour Option	£74	Serial Interface	£73
Cut Sheet Feeder	£125		
NEC Ribbons for		P6 £8;	P7 £9.50

Hewlett-Packard Printers

HP Quiet Jet Plus	£425
HP Desk Jet Plus	£525
HP Paint Jet Colour	£649
HP LaserJet Series IIP	£825
HP LaserJet Series II	£1275

Star Printers

Star LC10	£139	LC10 Colour	£195
Star LC24-10	£215	XB24-10 Colour	£410
NB24-10	£410	XB-10 Colour Kit	£24
LC10 Colour Ribbon	£5	Cut Sheet Feeder	£55

EPSON PRINTERS

EX800	£410	LQ550	£259
EX1000	£564	LQ860 Colour	£539
FX850	£310	LQ1050	£549
FX1050	£395	LQ1060	£679
FX1060	£679	LQ2550+	£895
GQ3500 Laser	£999	LX400	£135
LQ400	£205	LX850	£185
LQ850	£405	SQ2500	£899

CUT SHEET FEEDERS for

EX800/FX800/850/LQ800/850	£130
FX1000/LQ1000/1050	£175
LQ2550	£390
LX400/800/850/LQ400/500/550	£69

TRACTOR FEED for

LQ800 **£44**; LQ850/FX850 **£69**; LQ1050/ FX1050 **£85**; LQ2500 **£90**; LQ2550 **£90**.

ACCESSORIES

- EX800/1000 Colour Option £55
- EX800/1000 Colour Ribbon £14
- LQ2500 Colour Option £65

(Securicor Carriage on Printers £7)

EPSON PRINTER INTERFACES

All these interfaces fit inside the printer

RS232	£32	RS232 + 2K Buffer	£52
IEEE 488	£40	RS232 + 8K Buffer	£79

PRINTER LEADS

BBC Centronics 4' long	£5
BBC Centronics 6' extra long	£7
Compact's Special Centronics Lead	£7
Archimedes Printer Lead 1 metre	£6
Nimbus Centronics Lead	£6
IBM Parallel Lead 1 metre	£6
Double Ended 36 way Centronics Lead 4'	£7
Double Ended 36 way Centronics Lead 6'	£9
MSX Centronics Parallel Lead 4'	£12
RS232 Leads (Various)	P.O.A.

Listing Paper (Perforated)

- 1,000 Sheets 9.5" x 11" Fanfold Paper £7
- 2,000 Sheets 9.5" x 11" Fanfold Paper £11
- 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold £19
- 1,000 Sheets 15" x 11" Fanfold Paper £9
- 1,000 Sheets true A4 Fanfold Paper 70gms £11
- 2,000 Sheets true A4 Fanfold Paper 70gms £19
- Teleprinter Roll (Econo paper) £4

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50, 2K Sheets £3.00

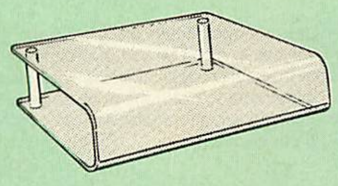
PRINTER LABELS

(On continuous fanfold backing sheet)

1,000 90 x 36mm (Single Row)	£5.00
1,000 90 x 36mm (Twin Row)	£4.90
1,000 90 x 49mm (Twin Row)	£7.50
1,000 102 x 36mm (Twin Row)	£6.25

Carriage on 1,000 Labels £1.00

Perspex Printer Stand



Give you Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version	**£16** (carr £3)
136 Column version	**£20** (carr £4)

Professional Printer Stand



This new professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and refold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Additional facilities include: Easy access to paper from both sides, used with both top and bottom feed paper and with its dial controlled paper feed system with adjustable deflector plates it ensures smooth paper flow and automatic refolding.

80 Column version £23 (carr. £3)
132 Column version £26 (carr. £4)

Printer Ribbons & Various Dust Covers

Type	Ribbons	Dust Covers
Brother HR15/20	£3.00	–
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
Citizen 120D	£3.95	£4.50
RX/FX80/MX80	£3.00	–
DMP2000	£3.75	£4.75
EX/LQ800	£4.50	£4.50
EX/LQ1000	£6.75	£5.00
RX/FX80/85/800/MX80	£3.25	–
RX/FX100/1000	£5.00	–
Kaga/Taxan KP810/815	£4.90	£5.00
LC10 (Black)	£4.25	£5.00
LQ500/800	£3.75	£5.00
LQ1050/LQ2500	£7.00	£5.50
LX80/86/800/850	£3.25	£4.50
M1009/GLP	£3.80	£3.75
NEC P2200	£6.00	£5.00
Panasonic KX1080/81	£3.50	£4.75
Panasonic KX-1124	£8.00	£5.00
SQ2500	£23.00	£5.50
Star NL10	£3.75	£4.50
Olivetti Ink Jet Cartridges (set of 4)	£9	

Our attractive Dust Covers are manufactured from translucent PCV. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Universal Printer Sharers/Changer

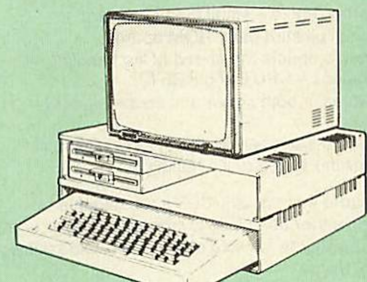
Connect upto 5 Micros to 1 printer or 5 Printers to 1 Micro with our combined, Sharer/Changer. These Units are made to a very high standard. For extreme reliability, they all have Printed Circuit Boards mounted inside the case, (not a Spaghetti Junction of wires). Internal connection is made via high quality ribbon cables.

(Ideal for School environments)

Connects	Serial	Centronics	P&P
2 to 1	£20	£22	£3
3 to 1	£27	£30	£3
5 to 1	£36	£39	£4

(Cables extra at £6 each. Please specify type required when ordering)

PLINTHS FOR BBC MICRO, MASTER & PRINTERS



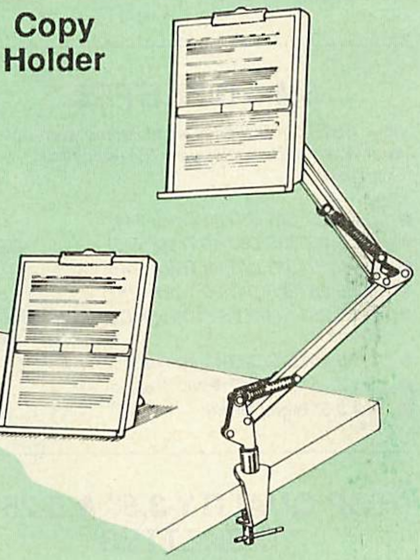
Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationary. The computer slides neatly in the lower section allowing easy access to remove the lid.

The single printer stand is equally sturdy but instead of cooling slots it has elegant cutouts on the sides. This allows easy access to paper from all sides. Colour: BBC Beige.

Single BBC Plinth	420 x 310 x 105mm	**£13**
Double BBC Plinth	420 x 310 x 210mm	**£24**
Printer Plinth	420 x 310 x 105mm	**£12**
Single Master Plinth	490 x 310 x 105mm	**£14**
Double Master Plinth	490 x 310 x 210mm	**£26**

(Carr. Single plinth £2; double plinth £3)

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding you paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

Desk Top **£7** (carr. £3)
Angle poise **£12** (carr. £3)

Handy Printer Switch

A handy two way compact printer switch that enables you to connect 2 Micros to 1 printer, or 2 printers to 1 Micro. Attaches easily to your printer, monitor, etc. A low cost solution for educational establishments. Ideal for those wishing to use a dot matrix and a laser printer. Available in two configurations.

Compact AB Switch Centronics	**£19**
Compact AB Switch RS232	**£18**

(Cables extra at £6 each)

MEGABUFFER 256



The Smallest 256K Printer Buffer Unit in the world **38mm x 130mm x 134mm.**

This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. The features are:

- Improves efficiency by making more efficient use of computer and printer.
- Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- Total compatiblity with all software.
- Cheaper phone bills when using your Modems.
- Ideal for those doing large graphics screen dumps that are slow to print.
- Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- Data Dump facility is included.
- Built in text unit for both the buffer & your printer.

Only £149 (carr £5)

Payment may be made by credit card, Connect card or cheque, but we also have available a range of finance terms, see the feature in our advert.

THE EPSON RX-FX-KAGA
Printer Commands Revealed

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you are with all sorts of printouts to show its capabilites – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out? Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from Basic and Wordwise.

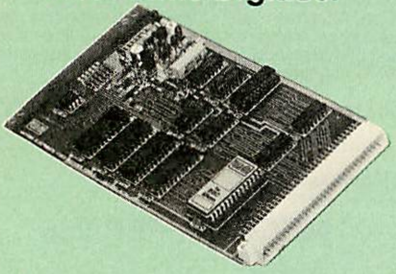
It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

VISA Access
CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

Continued→ → → → → → → → →

Archimedes Real-Time Digitiser

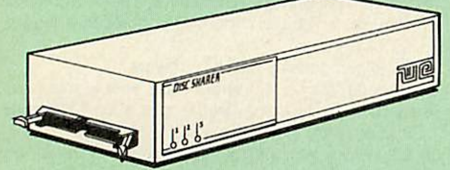


Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air televison signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £249

A Set of Colour Filters for colour image grabbing using a video camera £16

DISC DRIVE SHARER



(Ideal for educational establishments)

At last, a low cost alternative to the Econet system.Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Launch Price : **£65** Price includes 3 Cables

Acorn & Watford DFSs

- Watford sophisticated DFS ROM £16.00
- Watford DFS Kit complete £69.00
- We will exchange your existing ROM for Watford's ultimate DFS ROM at only £12.00
- DFS Manual (comprehensive) £6.95
- Acorn DNFS ROM £17.00
- Acorn ADFS ROM only £25.00
- Acorn 1772 DFS ROM Kit £49.00

(The single Density DFS system is now old technology. Like Acorn, Watford too have decided to replace it with the their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

DISC PLONKER RACK



When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the harzards of fingerprints, scratches, dust, coffee and an untidy desk.
Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs.

Protection at Only: **£2**

Watford's MkII 1770

Single/Double Density DFS

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features.

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!
If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£30.00**.

- SPECIAL PRICE £44.00
- DDFS Manual (No VAT) £6.95
- We will exchange your existing DFS Kit for our sophisticated DDFS for only £25.00

Please note, as the MkII DDFS is a hardware and sofware upgrade, it is not possible for existing Watford DDFS users to simply exchange the ROM for the new version.

DUST COVERS (For our Disc Drives)

Single CLS (without PSU)	£3.20
Single CS (with PSU)	£3.25
Twin CLD (without PSU)	£3.85
Twin CD (with PSU)	£3.90

3M – DISKETTES

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electonics your 3M Appointed Distributor

- *10 x 5.25" S/S D/D 40 Track 744)* **£5**
- *10 x 5.25" D/S D/D 40 Track 745)* **£6.50**
- *10 x 5.25" S/S D/D 80 Track (746)* **£8**
- *10 x 5.25" D/S D/D 80 Track (747)* **£9**
- *10 x 5.25" 1.6M D/S D/D High Density for IBM XT and AT* **£14**
- *10 x 3.25" S/S D/D 40/80 Track* **£9**
- *10 x 3.25" D/S D/D 40/80 Track* **£9**
- *10 x 3.5" High Density* **£25**

TOP QUALITY 3.5" & 5.25" DISKETTES

To complement our range of Quality Discs and Disc Drives. WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

- *10 x **M3** 3.5" D/S D/D 80 Track* **£9**
- *10 x **M9** 3.5" D/S High Density* **£22**
- *10 x **M4** 5.25" S/S D/D 40 Track* **£5**
- *10 x **M5** 5.25" D/S D/D 40 Track* **£7**
- *10 x **M7** 5.25" D/S D/D 80 Track* **£9**
- *10 x **M8** 5.25" D/S H/D Hi-Density* **£14**
- *3" Double Sided* **£2.50 each**

Special BULK OFFER on 5.25" DISCS

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

PRICES SLASHED

BULK PACK DISCS in lots of 100

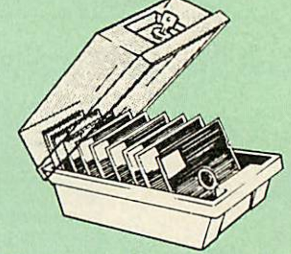
Type	S-S 40T	D-S 40T	D-S 80T
Without Sleeves	£30	£35	£40
With Sleeves	£33	£38	£43

FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. it is very simple to use. Available in 3.5" & 5.25", please specify.

Price £4

ANTISTATIC LOCKABLE DISC STORAGE UNITS

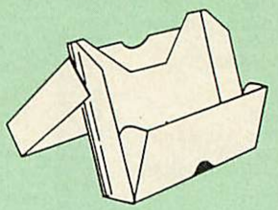


Gives double protection – Strong plastic case that affords real protection to your discs.
Antistatic helps avoid data corruption whilst in storage. The smoked top locks down.
Dividers and adhesive title strips are supplied for efficient filing of discs.

- **M35** – holds up to 50 5.25" discs £4.95
- **M85** – holds up to 95 5.25" discs £6.95
- **M25*** – holds up to 25 3.5" discs £4.95
- **M50** – holds 50 3.5" discs £6.50
- **M10** – holds 8 of No. 10 Data Cartridges £15

* Not lockable

PLASTIC LIBRARY CASES



Holds up to 10 5.25" Discs. **Only £2.00**

DISC ALBUMS

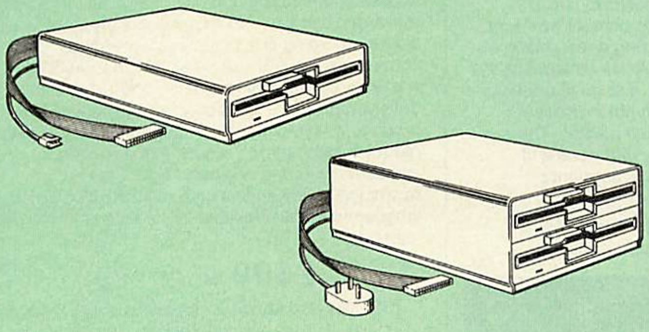
Attractively finished in black leather-look vinyl. Stores up to 20 discs. Each disc can be seen through the clear view pocket.

£4

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.
This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with an Utilities Disc.
The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our 80 track drives are already fitted with a 40-80 select switch.
***All our Disc Drives are Double Sided and will operate in both Single and Double Density modes.** Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*
Various UK "manufacturers" of disc drives for the BBC micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high qulity NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public. If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.
*Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. **Ideal for Schools & Colleges.** We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below are for single drives in standard single cases. Single drives in a dual case cost an extra £18. (At Watford we anticipate your needs of tomorrow, not just today!)*
When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with a Watford plinth. (Turn to the 4th page of our advert for the Plinths).
P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.

Our Disc Drives conform to BS415



"Test Bureau Approved for Use in Education"

Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
400K (720K)	CLS400S £75	CLD400 £168	CS 400S £85	CD400 £188
800K (1,44M		CLD 800S £153		CD 800S £163

● TWIN Disc Drive Case, complete with Power Supply & Cables **£43**
Securicor carriage on Disc Drives £6 to £7

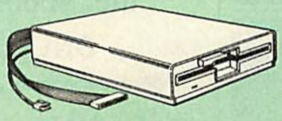
Prefix ***C** = Cased Drive*
***L** = Less PSU*
***S** = Single*
***D** = Double*

Suffix ***S** = 40-80 Switchable*

e.g. CLS400S = Cased Disc Drive, Less power supply unit, single 5.25" 400K, (720K in double density); Double sided; 40/80 track switchable.

Cable to connect 5.25" Disc Drives to BBC Compact
Single £9 Twin £12
Special Cable to connect both 3.5" and 5.25" Disc Drives simultaneously to the BBC Compact £13

Special 40/80 Disc Drive/DDFS Mk II Offer



- The popular 40/80 track 400K single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's extremely popular DDFS Disc Interface (allows 720K storage). Will run in both Single & Double Density modes.
- A comprehensive User Friendly Manual.

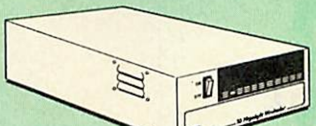
A Bargain at Only **£119** (£7 carr) (Offer valid while stocks last)

3.5" DISC DRIVE OFFER



These top quality 3.5" Double sided, 80 track, 1 Megabyte (unformatted each Disc Drives), are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Drives to connect to BBC Micros own PSU
● CLS35 400K Unit £65 ● CLD35 Twin 800K £119
Drives with built-in Power Supply Unit
● CS35 Single 400K £85 ● CD35 Twin 800K £129
(P.S. CS35 Single is supplied in a twin case with a blanking plate to enable easy expansion to a dual drive at a later stage).

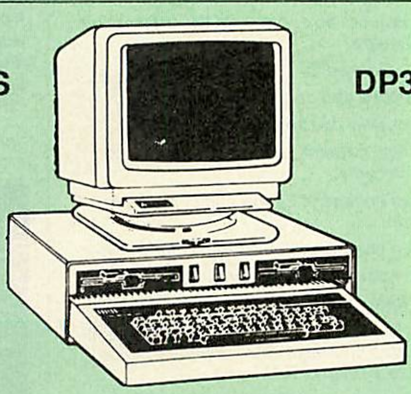


WATFORD's WINCHESTER DRIVES

Undoubtedly the best value for money Winchester Hard disc available anywhere for the BBC Micro.
This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with a Utilities Disc.
Finished in rugged metal and fetching BBC beige, the Winchester has an internal fan, so quiet you won't even hear it! A switched mode power supply and a neon-lit on/off switch are there along with a light on the hard disc to tell you when it is working – just compare the price with our competitors' 20 or 28 Mbyte discs!
Compatible with the Master, and the BBC B (with 17 X disc interface).

● 30 Megabyte BBC Hard Disc **£369** (carr £9)

CDPM 800S **DP35-800S**



Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

CDPM 800S for the BBC B & Master £175

A Double disc drive with a difference! Times are changing fast for the floppy disk, and whilst the current standard for the BBC B and Master series is the 5.25" disk, the standard of the future will most certainly be the smaller; faster and more reliable 3.5 inch disks – now a standard feature of both the Master Compact and the Archimedes Series.
To support the present disc drive users, and cope with the future, we have designed our own plinth-mounted disk system – called the DP35 800S. It contains both the 5.25 inch and the 3.5 inch drive formats as well as offer a firm and rigid support for a monitor on top. With the BBC Micro underneath, the plinth makes a surprisingly small footprint on the desk – leaving you more space to work with.
The 5.25" disc drive is 40/80 track switchable. DP35-800S has its own power supply, independent of the BBC Micro.

DP35-800S for BBC/Master £165
(Securicor Carr. £7)
(The above drive units are 2 Megabytes unformatted)

Continued→ → → → → → → → →

QUEST MOUSE Mk II

- Quest Mouse II & Quest Paint £58
- Quest Mouse II, Quest Paint, AMX Stop Press & Pagefont £89
- Quest Mouse II only £29
- Quest Paint Software only £34
- Quest Font Disc £15
- Quest Mouse Mat (Red or Blue or Green please specify) £3
- Part Exchange your unreliable AMX Mouse for a Quest Mouse for only £22
- GXR ROM for the BBC Micro £22 (P.S. Quest Paint is not compatible with BBC Compact)

N.B.
1. Quest Paint supplied complete with Software in a 32K ROM, Comprehensive User Guide and a Utility Disc.
2. Quest Font Disc has 22 text FONTS for use within Quest Mouse.

ConQuest

Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

Some of the features are:

- *Pick filenames off the screen for loading and saving.*
- *Rotate a cutout to any angle and Distort it to any four sided shape.*
- *Has Built in Font editor.*
- *Default brushes and patterns on startup.*
- *16 x 16 font available on start up.*
- *Ability to reset patterns, fonts and brushes to default at any time.*
- *ROM based enhanced Epson and compatible printer dump.*
- *ROM based enhanced extended picture routine.*
- *Ability to create and abort extended pictures.*
- *Improved disk access speed for extended pictures.*
- *User definable sideways RAM driver for incompatible sideways RAM systems.*
- *Ellipses at any angle on Master 128 (or B with GXR ROM).*

ConQuest ROM Package £30
(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

NEW

ARCHI Mk II MOUSE

An extremely reliable replacement mouse for Archimedes Micro £39

RB2 Marconi TRACKER BALL

RB2 (AMX/Quest compatible)	£45
RB2 including Quest Paint	£75
RB2-A for Archimedes	£52

THE NEW Mk III AMX MOUSE

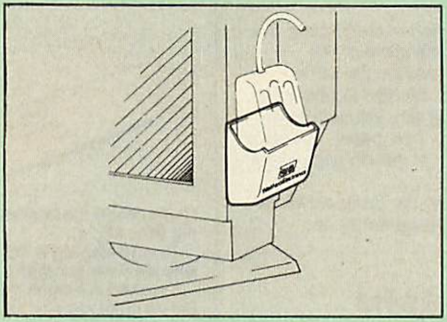
Inc. Super Art package

ONLY: £59 (carr £3)

(Please specify for BBC, Master or Compact)

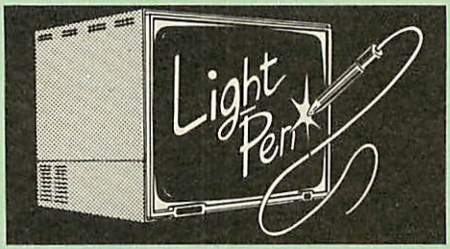
MOUSE MAT	£3
AMX MOUSE ONLY	£29
AMX SUPERART Package	£34
AMX STOP PRESS – A Desktop publishing software. Works with Keyboard, Joystick or a mouse	£32
PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£13
AMX DESIGN (ROM)	£55
AMX XAM Educational	£15
AMX EXTRA EXTRA	£16
AMX MAX A gem of desktop (ROM)	£20

WE MOUSE HOUSE



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive or desk. It protects it from damage when not in use, yet within easy reach when you need it again. There is also a second compartment for your pens and pencils – and at £4 it doesn't cost a rodent's ransom.

Price £4



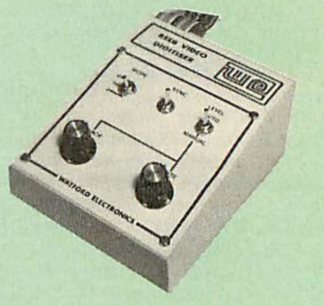
Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted. (Price includes FREE software Disc and Operating Manual)

Only £21

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Admin Xtra Disc Utility	£13
Walt Disney Disc Utility	£13
Fonts N Graphics Disc Utility	£13

BEEB VIDEO DIGITISER



"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.
This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.
Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem. The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.
Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.
Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional ★ commands. The package is designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROMs to work on it.
A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image. Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£109 (Carr. £5)

(BBC B+ and Master compatible, except Master with Econet)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

Magazine Maker

(As seen on TV)

A combination of Stop Press and Watford's Beeb Video Digitiser.

Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.

They can then be used within Stop Press to illustrate magazines or newsletters – in fact anything that needs to be created on A4 size paper.

With Stop Press's many features, a variety of pictures can be composed – the only limit being the imagination.

Pictures can be doctored using Stop Press's graphics option to produce any number of effects.

Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in Wordwise and View files plus much more.

Once created the picture can be printed out.

The Magazine Maker is suitable for any use that requires illustrated documents.

Complete Package **£135.00** (carr. £3)



The WAPPING EDITOR

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

PAGE LAYOUT SECTION

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module is a mode 0 version of the highly acclaimed Quest Paint package, detailed elsewhere in our advert, and incorporates all the same drawing facilities, e.g. pencil, brush, airbrush, polygon, circle, ellipse, fill, cut-and-paste, etc., etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

WORD-PROCESSOR

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

THE FONT EDITOR

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designed to take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individully proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.

Upgrading to the Wapping Editor could not be easier since the font editor will convert fonts from other packages, such as Quest Paint or Stop Press (formerly Pagemaker), into Wapping Editor format and a mode conversion utility will convert any screen in modes 1, 2, 4 or 5 into a full grey-scale mode 0 screen. Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser, either independantly or from within the Wapping Editor package.

For convenience all types of file may be stored on the same disc, with the software intelligently and transparently distinguishing between them. Filenames are picked off the screen with the mouse, dispensing with keyboard entry wherever possible.

"The Wapping Editor combines sophistication with ease of use and power with simplicity, to make it the most comprehensive and user-friendly DTP system ever likely to be written for the Beeb".

Wapping Editor Software Pack	£69
Wapping Editor plus Mouse	£89

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc. Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.

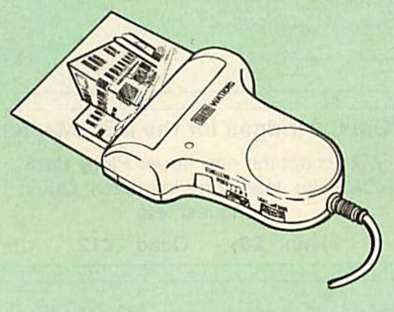
Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.

There are two prepared hi-res pages layed out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.

A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routine you can archive large numbers of screens onto a single disc.

£15

The Beeb HandScan
Hand-held Scanner for the BBC Micro



Watford Electronics are pleased to announce the launch of the first hand held scanner for the BBC Micro. HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs! These useful devices have been available for faster and more expensive micros for some time, but only now is Watford Electronics able to offer the BBC Micro computer.

The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilities provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various types of dithering may be selected to simulate the grey levels of a scanned picture.

All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

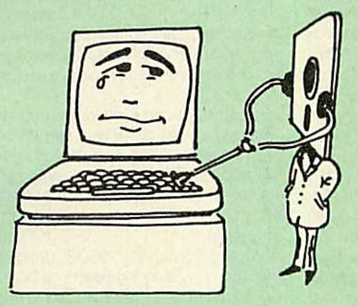
Beeb HandScan & Firmware **£135**

Wapping Font Disc

Sixteen Wapping Editor fonts including smaller versions of Oberon and Daisy and two new sizes of the standard font.
Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions.

£12

DIAGNOSTICS DISC



The BBC Micro is a very complex machine and thus diagnosing a fault can be very difficult. At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.

The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:

RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.

This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

(Only suitable for BBC B with 8271 DFS)

Payment may be made by credit card, Connect card or cheque, but we also have available a range of finance terms see the feature in our advert.

NEW

Beeb DOS 2.2

The BBC and IBM PC's are the most popular micros in the UK. The BBC is firmly established in the education sector and the IBM is the industry standard in the business world. The pools of information and applications held on these computers are immense, yet the means of passing information between them are very limited. Beeb DOS provides a practical method of transferring information between these two micros.

Beeb DOS is a collection of utilities which run on the PC's and enable it to read and write information on BBC discs. You can transfer files between your PC's 360K floppy, high density floppy or hard disc and your BBC discs. In addition Beeb DOS allows you to catalogue, format and compact BBC discs and delete, re-name, lock and unlock BBC files, all on PC's. Each Beeb DOS utility is written in IBM assembler and is run directly from PC or MS-DOS. The Beeb DOS utility can be run from floppy disc, hard disc or RAM drive.

Beeb DOS is supplied on an IBM 5.25", 360K disc complete with a comprehensive operating manual. (Will only work on 360K Disk Drives)

Price: £39

(Please write in for technical literature)

Continued→ → → → → → → → →

ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Cobal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved ★FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as th printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on you BBC micro – no flying leads to connect and no soldering. Provision of the onboard ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£69** (carr. £3)

Aries B-12 Sideways ROM Board

The B-12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost

Price:		
	Aries B-12	£36
	Aries B-12C	£5

ARIES B-488 IEEE-488 INTERFACE UNIT

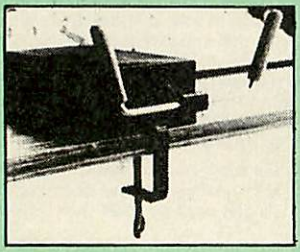
The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB or 'HP IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238 (Carr £3)

VOLTMACE JOYSTICKS

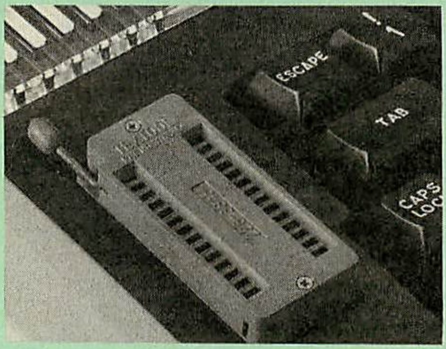
Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£15
Delta 3C Joystick for Compact	£10
Delta 14B Single Joystick	£11
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7
Delta-Cat A mouse eliminator Joystick for the Archimedes	£24

Delta Base B



Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128 — £25

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.

- The low profile of the socket allows unrestricted access to the Keyboard.

- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.

- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for professionals and Hobbyists alike.)

- BBC, B+ and Master compatible.

ONLY **£18** (carr £3)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

● Complete System	£11
● Spare Cartridges	£2.50
● Spare Rack	£1.50

ROM Cartridges for the BBC Master

Will accept the new larger Plggy Back ROMs like: Interword, Interbase, Quest, Conquest, etc

Twin **£8;** Quad **£12**

16K DISC RAM

(16K Sideways RAM Module)

Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.

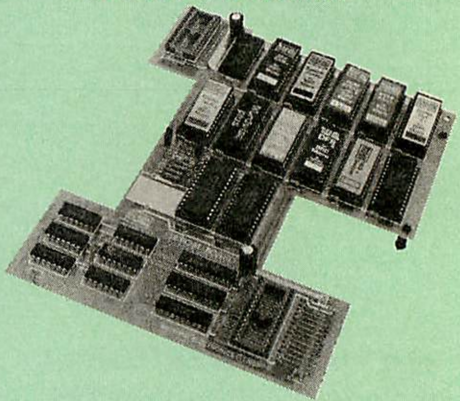
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances)
- Compact construction
- Supplied complete with Battery Backup.
- No overheating or overloading problems.
- Free utilities disc supplied
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£32** (carr £2)

P.S. 16K Disc Ram Board is not designed to work in conjunction with a Sideways ROM Board.

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:

- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35
Battery Backup fitted **£39**
Battery Backup only **£3**
16K Sideways RAM **£8.50**
(carriage £3)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

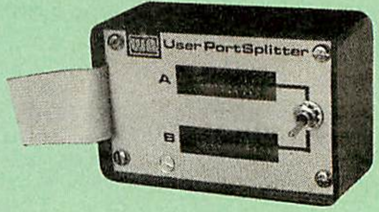
FINANCE AVAILABLE

In these days of expensive borrowing, we are pleased to have negotiated a special low rate finance deal for our customers, with flat interest rate of 12.25% per annum, typical APR 25.5%.

In addition to the above, we are able to offer all Archimedes and BBC Master computers as well as selected hardware on a 0% interest free finance deal.

For further details please telephone: 0923 37774 ext 223/203/201.

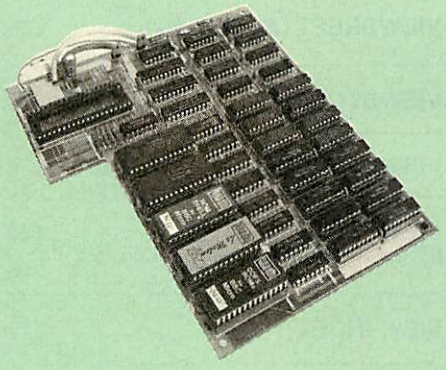
USER PORT SPLITTER UNIT



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaneously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination

Excellent Value at **£22** (carr £2)

ROM/RAM CARD



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 6 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- NO User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

Please write in for further details.

INTRODUCTORY PRICES:

- ROM/RAM card with 32k dynamic RAM £48
- ROM/RAM card with 64k dynamic RAM £65
- ROM/RAM card with a massive 128k dynamic RAM £109

(carriage on ROM-RAM Card £3)

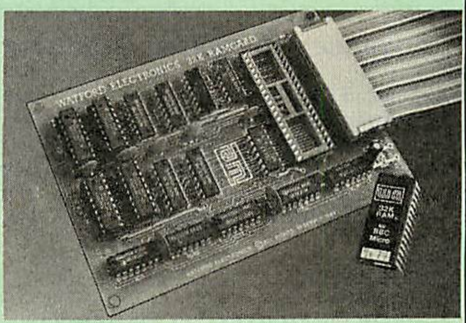
OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit £9
- 16k Dynamic RAM for Upgrade £13
- Battery backup £3
- Read and Write protect switches .... £2 each

Complete ROM-RAM board
All options installed £115

P.S.
IS your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford, ROM/RAM Board and pay £5 less.

32K
SHADOW RAM-Printer Buffer
Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16k or even 20k, but a massive 32k of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.

- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20k of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28k of program space.

- Use the FULL 32k or the bottom 12k of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS432 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138, 145,ADVAL etc). Please note only a 12k printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.

- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

Only £59 (carr £3)
(Price includes a comprehensive manual and the ROM)

INCREDIBLE WORDPROCESSING DEAL

Watford's 32k SHADOW RAM CARD and Computer Concept's INTERWORD Wordprocessor package.

at Only **£89** (Carr £3)

**CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383**

Payment may be made by credit card, Connect card or cheque, but we also have available a range of finance terms. See the feature in our advert.

BBC SOFTWARE'S Popular Educational Software

- Maths with a Story 1 (Disc). 4 primary level maths programs £11.25
- Maths with a Story 2 (Disc). 4 further maths programs. £11.25
- Picture Craft (Disc) 6-14 age group. Pack consists of flexible geometrical design & colouring programs. £17.00
- RELATIONSHIP: Science (Disc) O-Level Biology program. £20.00
- BONDING: Science (Disc) O-Level Chemistry program. £20.00
- ELECTROMAGNETIC SPECTRUM (8 Discs) O-Level program. £20.00
- ELECTRONICS IN ACTION (Disc) O-Level program. £19.95
- NEWTON & THE SPACE SHUTTLE (Disc) O-Level program. £20.00
- ECOLOGY (Disc) O-Level program. £20.00
- POLYMERS (Disc) O-Level program. £20.00
- Classification & Periodic Table O-Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule. £20.00
- FOOD & POPULATION (Disc) O-Level program. £20.00
- MICROTECHNOLOGY (Cassette) O-Level program. £11.25
- A VOUS LA FRANCE (2 Cassettes) A French language home study aid. £21.70
- DEUTSCH DIREKT! (Disc & Audio Cassette) £19.95
- Modem Master (Disc) £11.25
- ADVANCED TELETEXT SYSTEM £8.65
- PERIOD TABLE SOFTWARE £20.00
- Astronomy – Primary (Disc) £12.00
- Computers at Work – Primary £17.35
- Introducing Geography – Primary £17.00
- Introducing Geography 11-17 years £17.50
- Electric Fields 6-14 years £11.25
- Black Queen Contract Bridge £13.00
- Espana Viva – 3 Discs £19.95
- A Vous La France Disc £21.50

Educational Software

FUN SCHOOL 2 – Red:
Under 6 yrs – 8 programs on Discs, Shape Snap, Find the Mole, Teddy Count, Write a letter, Colour Train, Pick a Letter, Spell a Word & Teddy Bears Picnic.

FUN SCHOOL 2 – Green:
6-8 yrs – Eight programs on Disc, Number Train, Shopping, Maths Maze, Treasure Hunt, Bounce, Packing Caterpillar, 3 Number jump **£11.00**

FUN SCHOOL 2 – Blue:
Over 8 yrs – Eight programs on Disc, Build a Bridge, Passage of Guardians, Unicorn, Logic Doors, Souvenirs, Code Boxes, Mystery Machine & Escape. **£11.25**

Versatile BEEB SPEECH SYNTHESISER Unit



The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £3)

Continued→ → → → → → → → →

COMPUTER CONCEPT'S ROMS

DISC DOCTOR	£28
TERMI	£25
COMMUNICATOR	£49
WORDWISE	£24

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Wordwise plus £40

We are giving away absolutely **FREE**, the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear test-segment area.
- BBC B, B+ and Master compatible.

Only £24

(N.B. Word Aid requires a Disc interface in your Micro)

HI-WORDWISE-PLUS DISC: £5

SPELL MASTER £42

Inter SHEET ONLY £37

INTER CHART ONLY: £25

Inter-WORD £36

MEGA-3 ROM

Interword, Intersheet & Interchart – 3 in one ROM £76

INTERBASE £49

All Prices Exclusive of VAT

MINI OFFICE II

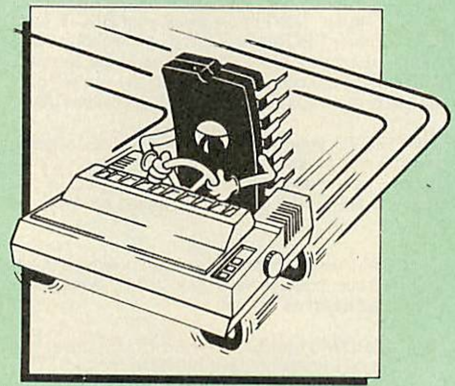
DISC Version for BBC B & B+	£14.00
DISC Version for BBC Master	£16.00
DISC Version for the Compact	£18.00

(When ordering please specify for which Micro & 40 or 80 track Disc)

Advanced Computer Products

Advanced Disc Toolkit	£28
Advanced Disc Investigator	£24
Advanced 1770 DFS BBC	£27
Advanced 1770 DFS Master	£28
Advanced File Manager	£24
Advanced Control Panel	£28

VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing at only a small outlay.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built-in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redifinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute ★ command when printing.

Other features include a very powerful on-screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory-based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33

VIEW 3.0 ROM	**£45**
VIEW PROFESSIONAL	**£50**
VIEWSHEET (Acornsoft)	**£36**
VIEWSTORE	**£36**
VIEWSPELL with 80 track disc	**£29**
VIEWPLOT Disc (Please specify for Master 128 or Compact)	**£20**
VIEW-INDEX	**£12**
OVERVIEW packs 1 & 2	**£65**

Watford's own Sophisticated VIEW PRINTER DRIVERS

Epson FX80 & Kaga KP (Disc)	£8
Juki & Brother HR15 (Disc)	£8

OFFICE MASTER



CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trial balance.
FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.
MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.
EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.
INVOICES & STATEMENTS – Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.
STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21** (Disc)

OFFICE MATE



- DATABASE
- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS

DATABASE – Set up a computerised card index system with powerful search facilities.
SPREADSHEET – Offers many calculation and editing features
BEEBPLOT – Provides visual representation from Spreadsheet data.

OFFICE MATE Only £10 (Disc)

BOOKS (No VAT on Books)

15 Hr Wordprocessing BBC/View	£5.95
15 Hr Wordprocessing BBC/WW & WW+	£5.95
30 Hour BASIC (BBC Micro)	£12.95
Advanced User Guide for BBC	**£10.95**
Amiga Machine Lang. Guide	£19.95
Archimedes Assembly Language	£14.95
Archimedes Operating System	£14.95
Archimedes Risc-Os Programmers Reference	£79.00
Assembly Language Prog. for the BBC	£10.95
Assembly Language Quick Ref.	£21.95
BASIC 2 – User Guide	£2
Basic V – A Dabhand Guide	£9.95
BBC Basic Guide (Archimedes)	£19.95
BBC BASIC – Mathematical Programs	£8.95
BBC Computer Handbook – The Complete	**£14.95**
BBC – Mastering Assembly Code	£8.95
BBC Micro & the small Business	£5.75
BBC Micro – File Handling On	£8.50
BBC Micro – Within the	£13.95
BCPL User Guide	£14
C Big Red Book of	£7.50
C – A Dabhand Guide to	£14.95
C for Programmers	£9.95
C Programming Lang. 2nd Edition	£24.95
COMAL – Introduction to	£9.50
Complete FORTH	£6.95
Deutsch Direkt! (Book only)	£5.95
DNFS Instruction Booklet	£2
DISC FILING SYSTEM (DFS) Operating Manual for BBC	£6.95
File Handling on BBC Micro	£8.50
FORTH – Advanced	£9.95
FORTH on the BBC Micro	£9.95
Hackers Handbook – New	£6.95
Introduction to COMAL	£9.50
Inside Information, Computers & Coms.	£9.95
ISO-PASCAL Reference Manual	£9.95
Logo on the BBC Micro	£7.50
Mysteries of DISC DRIVES and DFS REVEALED	**£5.95**
Mastering Assembly Code	£8.95
Mastering Interpreters & Compilers	£14.95
Mastering Music	£6.95
Mastering the Disc Drive	£7.95
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Master Operating System	£12.95
Master Reference Manual Part 1	£14
Master Reference Manual Part 2	£14
Master Reference Manual – Advanced	£19
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MINI OFFICE II – A Dabhand Guide	£9.95
PASCAL – Introduction to	£17.95
PASCAL on the BBC Micro	£9.95
PASCAL Programming	£9.95
Practical Disc File Techniques	£5.95
The Epson FX-KAGA PRINTER Commands REVEALED	**£5.95**
The Software Business	£5.50
Understanding Interword – A Beginners Guide	£6.50
View 3.0 User Guide	£10
View Guide (View 2.1)	£4.50
Viewsheet & Viewstore Dabhand Guide	£12.95
Mastering View, Viewsheet & Viewstore	£12.95
VIEW Dabhand Guide	£12.95
Viewsheet User Guide	£10
Viewstore User Guide	£10
Writing Interactive Interpreters & Compilers	£8.45
Wordwise + A User Guide	£9.95
Z88 Computing	£9.95
Z88 Using Your	£9.95

Carriage on Books vary between £1 to £3.50, depending on their weight.

BOOKS for IBM PC & Compatibles

1-2-3 For Business 2nd Edition	£20.95
1-2-3 Command Language	£19.95
1-2-3 Mastering Release 3	£22.95
1-2-3 Special Edition (QUE) – Using	£21.95
8086/8088 Assembly Language Prog.	£12.45
8086/8088 Programming the	£17.95
Ability – Using	£12.95
Accountancy software in Business – Using	£12.95
Advanced Tech. in Turbo Pascal	£19.95
Agenda – Using	£21.95
Aldus PageMaker – Using	£21.45
Amstrad Basic 2 Manuals	£9.95
Amstrad Technical Manual for 1640	£19.95
Amstrad PC Programmers Ref Guide	£7.50
Amstrad PC1512-1640 Step by Step – Using	£8.50
Amstrad PC 1512 PC User Guide – 2nd Ed	£9.95
Autocad – Mastering Through Rel. 10	£28.95
Autocad – Using Release 10	£26.95
Business companion on the 1640	£12.95
dBase III – Mastering	£21.95
dBase III Plus	£12.95
dBase III Plus – Complete Reference	£19.95
dBase III Plus – Mastering	£21.95
dBase III Plus Handbook 2nd Edition	£20.95
dBase III Plus – tips, tricks and traps (QUE)	£20.45
dBase III Plus – Quick Ref. Guide	£4.95
dBase III Plus – Quick Prog. Guide	£8.95
dBase Instant Reference (III & III+)	£10.95
dBase IV – Handbook	£21.95
dBase IV – Understanding	£22.95
dBase IV – Using	£20.95
Desk Top Publishing by Design	£18.95
DOS Instant Reference (up to 3.3)	£10.95
DOS, Mastering for Versions up to 3.3	£22.95
DOS Power Tools (includes a disk)	£39.95
DOS Plus Manual/Amstrad PC	£10.95
DOS – Programmers Ref. Manual 2nd Ed	£22.95
Excel IBM Version – Using the	£22.95
FAX – Managing with	£12.95
Framework III – Mastering	£22.95
Good Software Guide – for IBM PCs	£19.95
Hard Disc Instant Reference	£10.95
Hard Disc Manage IBM PC XT AT	£18.95
Hard Disc – Managing your 2nd Ed.	£20.95
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- View internal format
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At the rear of the manual there are pull out circuit diagrams for the Master 128K.
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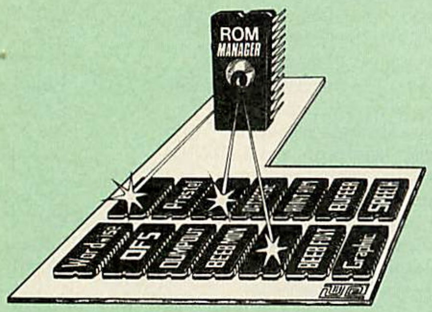
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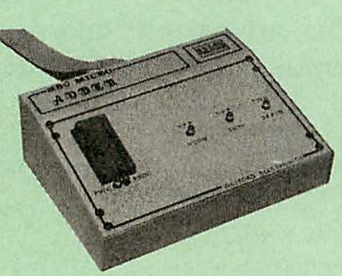
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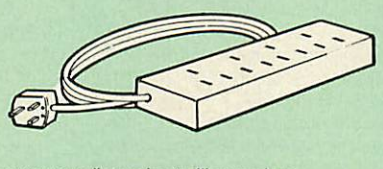
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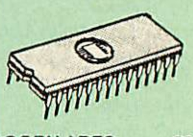
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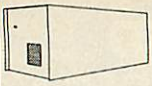
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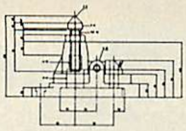
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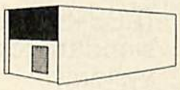
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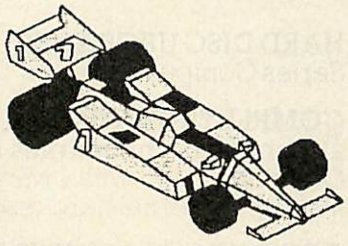
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The **shell** is a ready-to-run RISC OS application in line with Acorn's guidelines. The shell uses a large body of **run-time** code. The run-time automatically handles windows, menus, icons, etc. so detailed knowledge of the WIMP manager is not needed. You extend and fine-tune the shell by adding menus and windows using the tools, and writing functions and procedures to carry out the tasks of your application.

An in-depth user guide takes you gently step-by-step through a progressive series of some 50 program building sessions from complete beginner to advanced level. All examples are on disc ready to run.

The complete system (V1.2) comes on 4*800k discs with a 500-page ring bound user guide. You need an Archimedes or A3000 with 1M or more of RAM and fitted with RISC OS. One disc drive is sufficient. There is no extra licence fee to distribute copies of the run-time in your programmes.

Access — Cheques/POs/official orders or Access/Visa number and expiry date. 24-hour 'phone for Credit Card orders. — VISA

★ Create a new, ready-to run shell application from the tools menu by a simple RISC OS file save operation. Now double-click SELECT on your new application. It loads and appears on the iconbar. Click MENU on its iconbar sprite. A menu with the standard 'Info' and 'Quit' items pops up. Click SELECT on the sprite and a main window appears complete with its own menu. This is your starting point.

★ Handle menus automatically with the run-time. Call BASIC functions direct from menus. Pop-up windows direct from menus. Chain menus together. Set-up menu fonts and colours. Shade and tick menu items. Accept user input into BASIC variables with writeable menu items.

★ Handle standard window types almost automatically with the run-time. eg warning messages, scrolling lists, displaying '!Edit', '!Paint' and '!Draw' files, file saving, window printing, radio button sets, etc.

★ Set-up the contents of more complex windows visually with WYSIWYG editors.

★ Place icons in windows to provide powerful but easy-to-program facilities. Pop-up menus from icons. Call BASIC functions direct from icons. Accept user input into BASIC variables with writeable icons. Display the contents of BASIC variables in icons.

"You get an excellent piece of software which will make the mountain of programming needed to operate the WIMP environment into a molehill". ". . . you can create a complex WIMP environment very quickly . . . I have had no end of use out of this easy-to-use package . . ." — Archive, July 1989

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ADU is an invaluable utility for all ADFS users. It adds over 22 new * commands to the ADFS filing system as well as providing an extensive menu facility with over 35 sub-commands covering areas such as repeated disc compaction, saving and loading rom images, auto booting of files and many more.

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The full auto route facilities are available even on an un-expanded model 'B' computer.

'PCB autoroute is remarkable. No similar software comes near the price' Acorn User — Aug 88

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BBC ACORN USER 1989/90 AWARDS

This is the first ever presentation of the *BBC Acorn User* awards – bestowed on the most deserving hardware and software in the Acorn world.

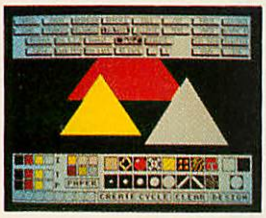
Nominations for the awards came from you, the readers of *BAU*. A few even arrived from software and hardware companies nominating themselves!

Now all the nominations have been considered by the judges and this month we present the results of the software section of the awards. There are eight categories and for each there are two awards – one for the 8-bit range of Acorn micros and one for the 32-bit range. The hardware and general categories will be presented in next month's issue.



BEST ART/GRAPHICS SOFTWARE

8-BIT QUEST PAINT WATFORD ELECTRONICS



For ease of use whilst maintaining the maximum flexibility, *Quest Paint* is the clear winner. Impressive mode 1 pictures can be created quickly using a vast selection of tools modelled on the *Macdraw* type (but in colour, of course).

All the things you'd expect in an art package are present. The fill option allows any pattern to be used and the predesigned dithered patterns give the effect of more than four colours in mode 1.

One of the best features of the package is its pixel editor which allows individual changes to be made dynamically at magnifications of two to eight.

Some months after *Quest Paint*, Watford released the *Conquest* extension Rom which adds a host of extra features including rotations, ellipses and arcs. Text manipulation is greatly enhanced with a built-in font editor which in turn, is compatible with fonts from other packages such as AMX *Stop Press*.

Any extra sideways Ram can be put to good use to hold extended pictures. Screens of up to 640x256 pixels can be created on disc or sideways Ram.

Quest Paint and *Conquest* can be bought together along with a Quest Mouse for £101.20. It may sound a lot, but you are getting three professional products that can't be beaten in the Beeb world.

Runners up

Only the old AMX *Art* and *Superart* packages (nowadays also from Watford Electronics) really provide much competition for *Quest Paint* but these are not up to the standards of the winning softwate.

32-BIT ATELIER MINERVA SOFTWARE



Although not the ultimate art package, *Atelier* stands head and shoulders above the competition on the Archimedes. For £100 you get a lot of software.

Working in mode 15 (with 256 colours), *Atelier* provides an almost endless list of tools with which you can create or manipulate your sprites.

Anything from simple doodles to detailed artwork can be produced with *Atelier* in a remarkably short time, to rival pictures produced on systems costing thousands of pounds.

Perhaps the major drawback with *Atelier* is that it is not written using the Risc OS window environment.

With more and more software conforming to the Acorn standard, it's offputting for the new user to master a different system of operation. Nevertheless, the window system used is easy to operate once learnt.

Atelier scores highly in the areas of flood fills and sprite manipulation. The graded fills are the best in any art program and it is hard to distinguish where colours merge. Sprites are well supported with an individual sprite editor plus a number of mask related tools.

Runners up

Art Nouveau is just pipped at the post by *Atelier*. However, it does cost only £42.50 for a full featured package so for the faint-of-wallet it's well worth a look-in.

In third place is perhaps the most (in)famous package of the lot, *Proartisan*. What originally stunned people with its 'innovative features' now looks rather dated against the competition and seems quite expensive at £180.

BEST BUSINESS SOFTWARE

8-BIT VIEW FAMILY ACORN



The humble *View* wordprocessor has grown into a whole familiy of associated products and the *View* family represents a most powerful package for business Beeb users.

View itself has been through several incarnations, each one adding features and removing any bugs. It supports most wordprocessing features including search and replace, cut and paste, and definable highlighting. A spellchecker, can be added with *Viewspell*, and *Viewindex* provides a rarely found function essential for authors.

Viewsheet and *Viewstore* are the associated spreadsheet and database managers. The whole lot can be integrated and information passed easily between each. *Viewsheet* provides the standard spreadsheet functions and a wide range of calculations including trigonometry.

Viewstore allows random access files up to any size depending on the storage capacity and provides powerful database interrogation and report generation facilities.

Together, the *View* family provides a complete solution for the small business user with the flexibility to allow you to build the system to suit, depending on your needs. *View* (£55.20), *Viewsheet* (£41.40), *Viewstore* (£41.40), *Viewspell* (£33.35), *Viewplot* (£23.00) and *Viewindex* (£13.80) are all available from Acorn.

Runners up

The main rivals to the *View* family are *Interword*, *Intersheet*, *Interstore* and *Interchart* – the *Inter* family – from Computer Concepts. Although these have an enthusiastic following, they are just pipped at the post by the *View* family's simplicity and its wider user base.

32-BIT PIPEDREAM COLTON SOFTWARE



Pipedream evolved from the *View* wordprocessor on the BBC micro, first as *View Professional* (again on the BBC) and then *Pipedream* (on the Arc and even in versions for IBM PCs and the Z88).

Now in it's third version, *Pipedream 3* costs £169.05 and is a fully Risc OS compatible wordprocessor/spreadsheet/database combined. Text can be imported from a number of other packages, including *View* and *First Word Plus*, and exported in a similar manner.

Effectively a spreadsheet with wordprocessor facilities, *Pipedream* is based on a grid of rows and columns, into which numbers, words or a combination of both can be placed. Variable cell sizes are supported, the only limit being the amount of memory in your Archimedes.

The list of spreadsheet facilities is extensive with mathematics (such as trigonometry) and financial functions all well supported. A spellchecker is included and allows fast postchecking or real-time checking of documents.

Using the Risc OS desktop, *Pipedream* can support the anti-aliased fonts and other 'standards'. Both sprites and line art files can be imported into documents for easy production of graphs to accompany text and tables.

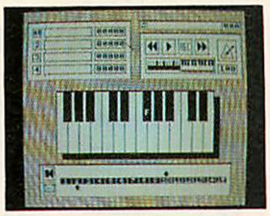
Runners up

Business software on the Archimedes is still a bit thin on the ground although next year will see a different story.

The *Logistix* spreadsheet/database comes a rough second and the *First Word Plus* wordprocessor third. Both packages are available from Acorn.

BEST MUSIC SOFTWARE

8-BIT MUSIC SYSTEM APPLIED TECHNOLOGY



This package was originally launched in 1984 as the Island Logic Music System by the software wing of Island Records. The program was written by System Applied Technology (then called just System) and is still sold by it (for £20) today, since the sad demise of Island Logic.

The Music System provides quite an amazing sophistication of control of music from the now rather diminutive Beeb sound hardware.

The software comprises a series of modules which all use the same tune data for different operations.

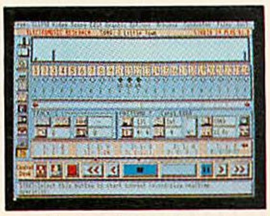
There is an Editor for writing music on the bass and treble staves, a Synthesiser for designing the sounds with graphical representations of the envelopes, a Keyboard module for entering music using the Beeb keyboard as a musical keyboard, the Linker module for composing complete works from small sections and the Printout module which produces proper 'sticks and blobs' sheet music from your composition.

The Music System was one of the first Beeb programs to make extensive use of icons and windows. The program also gained noteriety with the irreverent and (some say) shocking adverts which accompanied its launch.

Runners up

The once blossoming Beeb music scene has dwindled somewhat of late. EMR's Miditrack series MIDI interface and software cleans up the MIDI side of things. For the Beeb's internal sound generator, only Beebugsoft's Murom and Studio 8 hold much competition for *The Music System*.

32-BIT STUDIO 24 PLUS ELECTROMUSIC RESEARCH



The Archimedes really has its work cut out to compete with the already well established Atari ST music market. However, EMR's £99 *Studio 24 Plus* shows just what a Risc machine can achieve in this blossoming field.

Studio 24 Plus is a full MIDI sequencer package for use with any MIDI instrument or expander module and an Archimedes MIDI interface.

There are 24 'tracks' provided. MIDI data is entered from an external keyboard or the editor, manipulated and played back any number of tracks at a time.

A great many data editing facilities are provided. The software does not make use of the full Risc OS environment but it is heavily windows orientated and is controlled with the mouse. Extensive help screens make learning to drive the package easy even without reference to the manual.

Studio 24 Plus can also be used with Arc internal sounds and the recently released version 2 adds many more features to the package, such as SMPTE video synchronisation, sheet music printout and more.

Runners up

EMR's other packages cover a wide range of musical applications with a particular bias towards education and with *Studio 24 Plus* form the *Arpeggio* music system.

The professional MIDI sequencer from Pandora software is not yet available but will strengthen the Arc's music image when it arrives.

The *Armadeus* sample manipulation package from Clares also deserves a big mention. This 1989 latecomer performs minor miracles on sound samples.

BEST COMMUNICATIONS SOFTWARE

8-BIT COMMSOFT SOFT MACHINERY



Although *Commsoft* is one of the oldest comms packages for the Beeb it is still considered by many to be the best.

Supplied in Rom form, with optional modem drivers in Rom or on disc, *Commsoft* is designed for the BBC micro, unlike some other packages which do not fully utilise the machine's capabilities.

The package is designed for use with viewdata or scrolling types of host system and can be used in a number of screen modes. However, by far the most impressive feature is the viewdata mode with its sophisticated on/off-line editing facilities, a number of which have been copied in subsequent packages.

Buffering of incoming data can be to disc or memory and CET and Xmodem CRC file transfer protocols are included. The package is simple to use, yet completely configurable.

This allows the more experienced user to set up default settings and to an extent *Commsoft* operations can be automated.

Runners up

Commstar from Pace Micro Technology is another matured package.

Like *Commsoft* it can be used in a variety of screen modes. Viewdata and scrolling emulations are featured and the package boasts one of the fastest CET downloaders.

A more modern package, adopted by many bulletin board operators is Beebug's *Command* Rom. The majority of facilities are accessible via star commands, and so can be used in programs.

Command can be used with manual or semi-automatic modems and a Hayes version is compatible with the latest breed of intelligent modems.

32-BIT ARC COMM BBC SOFT



Compared to the Beeb packages, Archimedes software tends to be rather expensive. Not so in the case of *ArcComm*. At £30 this Risc OS semi-compatible package is easy to use, yet features some excellent features for viewdata users.

In many respects the package is not as sophisticated as Beebug's *Hearsay* or the Serial Port's *Arcterm*, yet it provides international viewdata compatibility with systems such as Prestel, the French Minitel system and even the German Bildschirmtext system.

The lack of a teletext chip within the Archimedes specification has meant that software has to emulate teletext mode, not always all that successfully. *ArcComm* does this beautifully.

Other highlights include the use of the Arc pointer which can be used for page keying and, to a limited extent, support of Prestels Vasscom error correction protocol.

ArcComm also features a procedure command language which can be used to customise the whole package for any particular host.

Runner up

The more demanding user tends to opt for Beebug's *Hearsay* which features view–data, Ansi (IBM) and a range of VT emulation modes.

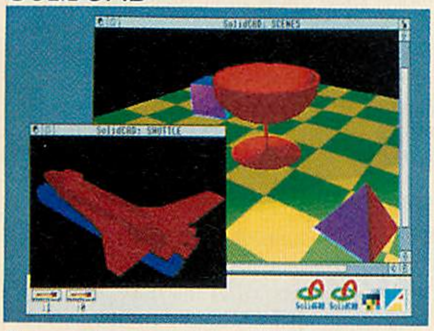
File transfer protocols include CET, X/Ymodem, Sealink as well as Ascii. The package makes extensive use of pop-up menus and incorporates a telephone directory with auto-dial and log-on facilities.

However, such advantages must be paid for and *ArcComm* ends up the better value of the two packages.

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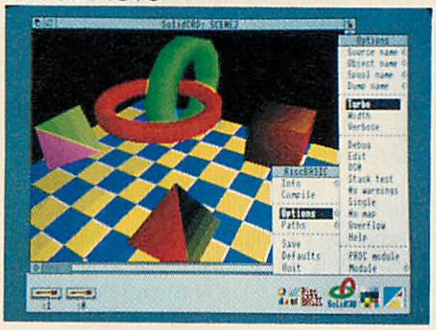
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- RISC USER August 1989.

"In summary, BASIC V is the best version of BASIC produced and RiscBASIC provides the most compatible, fastest compiler for this language. This will be an invaluable addition to every serious BASIC programmer's toolkit. My congratulations to Silicon Vision" - Archive June 1989.

"very useful indeed for development work...produced significantly more efficient code" - Micro User July 1989.

"RiscBASIC wins the race...has the edge overall...more likely to provide the correct results" - BBC Acorn User Nov 1989.

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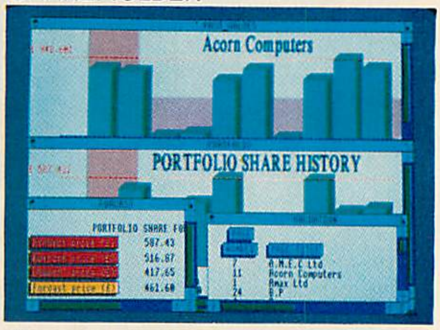
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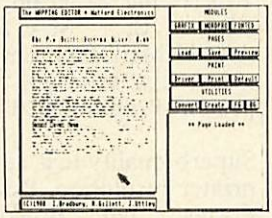
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BEST DTP/WORDPROCESSOR

8-BIT
WAPPING EDITOR
WATFORD ELECTRONICS



Quite apart from being a page layout program which exceeds most people's expectations of the Beeb, *Wapping Editor* includes a simple wordprocessor and so scores extremely well in this category.

Running on the model B, B+ and Master 128, *Wapping Editor* costs £79.35 and is entirely mouse driven. Font support is excellent with 13 different styles and an advanced font editor is built into the Rom. This is almost as feature packed as the art program, with flip and rotate functions, among others.

Pages are created either in Ram (if there is enough) or on disc. Eight page sizes are available and sizes can also be customised by the user if need be.

A *Wapping Editor* support Rom image is provided on the disc which adds a number of utilities to enhance the use of the original. *Wapping Editor* can be further enhanced with a disc containing 250K of 'clip-art' (£17.25) and the *Wapping Font* disc (£13.80) which adds another 16 fonts.

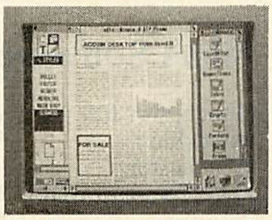
Runners up

Other Beeb DTP systems worth mentioning are AMX *Stop Press* (also from Watford) and *Pixel Perfect* from AVP.

In the field of wordprocessing the main contender is of course *View*, but as the *View* family has clinched the prize in the Business category, it seems fair for *Wapping Editor* to win here.

Wordwise Plus should also have a mention. Despite the fact that *View* is being given away with Masters, there are still thousands of dedicated *Wordwise Plus* users who thrive on its ease of use as a wordprocessor and the flexibility of its built-in programming language.

32-BIT
ACORN DTP
ACORN



Acorn DTP was the first new desktop publishing program to be written for the Archimedes. Like *First Word Plus*, *Acorn DTP* is based on an existing package, written for the Atari ST by GST. It contains all the features of its predecessor *(Timeworks)* plus a number of enhancements to take advantage of the Arc's extra power.

Pages are created by first designing a master (or template) page. This can contain, amongst other things, the number of text columns, where grid lines should be placed, and heading sizes. Once defined, the master page controls the style of each successive page.

As well as text, *Acorn DTP* can use files created with *Paint* and *Draw*.

A selection of 'clip-art' is supplied with the program to start you off.

Acorn DTP also includes a number of upgrades to Risc OS – two new printer drivers for Hewlett Packard Laserjet and Integrex Colour Inkjets, two replacement drivers for Postscript and dot-matrix printers, and a new Font Manager with 14 new fonts, streets ahead of anything used on either Apple or Sun machines.

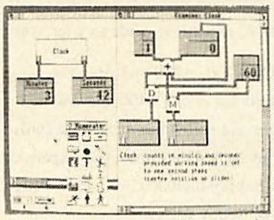
Runners up

Apart from AVP's Arc *Pixel Perfect*, there is little available yet for Archimedes DTP, although much is on the way soon with packages from Computer Concepts, Clares and Beebug.

The wordprocessing front is also sparse, mustering only *First Word Plus* and *Pipedream*. *Pipedream*, especially *Pipedream 3*, is a close contender for the title but as it would be greedy to give the package two awards, *Acorn DTP* wins here.

BEST EDUCATIONAL SOFTWARE

8-BIT
NUMERATOR
LONGMAN SOFTWARE



This 'mathematical engine' software is seen by many as a powerful software tool at all levels of education. The principle is to create boxes containing statements, formulae or results and link them to form a particular mathematical system.

The idea is similar to that of a spreadsheet except the links between the cells of the system are explicit, that is to say they are drawn on screen so it is possible at any time to see the way in which the software is reaching its results.

This dynamic overview is a big attaction to teachers having to explain complex structures to pupils of all ages.

Since the software may be used at a very simple level or to create complex mathematical expressions there is a place for *Numerator* in classrooms in the lower primary school (linking its use with the normal mathematical equipment) and through into the secondary school. Moreover, it is possible to use the system to log data from a data file or direct from the analogue port in order to develop investigative work.

Runners up

A close second was *Designer Castles* from Data Design. This innovative software allows the pupils to create a plan of a castle and then print out its component parts on printer paper and fix them together.

The basic steps of the design process are encouraged with pupils able to create a plan, refine it, view it and modify it before finally printing their design.

Other strong contenders were *Worlds Without Words* (4Mation), *Folio* (Tedimen), *Pendown* (Logotron), *Key* (ITVA) and *Fairy Tales* (Resource).

32-BIT
DROOM
RESOURCE



A mathematical and logical adventure for primary age pupils, *Droom* was first produced for the BBC micro.

The adventure is basically a story of dragons and princes turned into frogs, of captive princesses and heroic deeds of daring-do – except that the main characters are not human at all but are strange-looking creatures called Little Bit, Middle Bit and Big Norman.

These three lead the pupils through an adventure in which they tackle simple logical and mathematical problems derived directly from the classroom context.

This is hardly surprising since the author of this package (and incidentally the high-polling *Desktop Stories* for the Archimedes) is a primary school head teacher, Derek Allen, who originally created all his materials to fulfil the needs of the pupils in his own school.

Archimedes *Droom* is a complete rewrite of the original BBC model B version with improved graphics and mouse control of many aspects of the program.

Runners up

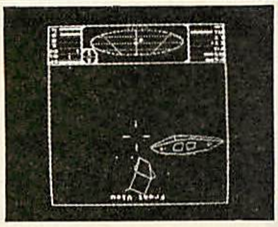
Also rans in this category include *Numerator* (mentioned above) and *Pipedream* (Colton Software) which was seen by voters as being more than just a wordprocessor, or a spreadsheet, or a database. Its combined features enabled its use to be configured to a wide variety of educational purposes, limited only by the imagination of the user.

In addition, many of the packages from Clares received nominations but, because of their range, the vote for software such as *Artisan* and *Render Bender* was diluted.



BEST ARCADE GAME

8-BIT
ELITE
SUPERIOR/ACORNSOFT



Call us sentimental, boring even, but most would agree there is yet to be a true successor to the country's most famous game.

BBC *Elite* took the games world by storm in 1984. Most were struck by the sheer enormity of it, others by the speed and a few clever hackers were impressed by the heavily compacted coding. But all united on one point which can be summed up as amazing!

Elite requires a 'city' mind to handle all the trading but the fun is in the inter-planetary travelling and the trouble you can encounter on the way.

You do need to read a fair amount before playing – it is not a load-and-go program in that respect and there are almost more keys to learn than the Beeb has.

But once crossed, these hurdles fall into the shadows and the real fun begins. If you don't have *Elite*, it is still available and in enhanced form for Master or tube owners. Buy it, you won't regret it.

Runners up

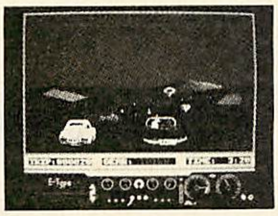
There are many other arcade games which deserve recognition, so here are a few. *Snapper* from Acornsoft, is a good implementation of *Pacman* and better than some games being produced even today.

Stryker's Run and its sequel *Codename: Droid* (both from Superior) are good fun, the former being the first to really exploit the extra Ram in the Master computer.

Frak, *Zalaga*, and *Firetrack* all make good games and all come from the same programmer, the highly acclaimed Orlando - who else?

Finally, the best game for at least two years has got to be Superior's *Exile*.

32-BIT
E-TYPE
THE FOURTH DIMENSION



There's something wickedly attractive about car simulators, especially realistic ones like *E-Type*. You can roar over those hills, smash aside the ghastly pink Minis and tear round corners.

What makes this game even more exciting is that in this particular simulator, you don't have to be a well co-ordinated octopus with a Master's degree in motor mechanics to play.

E-Type has definitely been 'borrowed' from *Out-Run* and has (arguably) the best graphics ever on an Acorn machine.

A vital extra is the track designer. Though badly programmed it prolongs the life of the game enormously.

Runners up

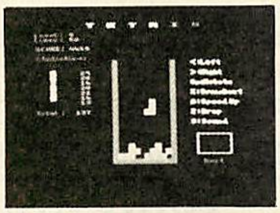
Since it didn't make the first slot, *Pacmania* from Grandslam is first of the runners up, combining loads more dots, an extra dimension and a bouncy Pacman. Many critics compare it to Acornsoft's *Snapper* but it's a very different game. The skills and methods built up in *Snapper* are useless when it comes to *Pacmania* but nevertheless the Archimedes version is enormous fun.

Interdictor, the flight 'simulator' from Clares is also worthy of a mention. Although not startling in its execution, the use of solid animated graphics is about the best yet seen on an Arc. Certainly not the last word in simulators but not a bad starter all the same.

Lastly, *Zarch* needs no introduction as the best first game on any machine anywhere. It is a worthy addition to any collection, even though you will probably already have *Lander*.

BEST STRATERGY GAME

8-BIT
TETRIS
MIRRORSOFT



Tetris is the only game ever to be converted from a Soviet computer and marks another milestone for Glasnost, bringing with it some total addiction. The object is to control how and where a fast falling shape lands in a square jar.

It's easy to begin with, but as more shapes fall, the harder it becomes to fit them in without leaving any gaps. If you're not quick enough the screen begins to look like one of those breakwaters found between the harbour and the open seas. The speed at which they fall is definable and it is possible to 'cheat' by having it show what the next shape will be before it arrives, making *Tetris* a game suited to all.

Tetris is the perfect example of how a game can be a winner on the addiction factor alone, despite relatively uninspired graphics and sound.

Runners up

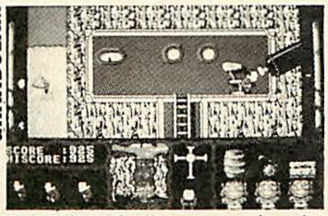
If it's proper strategy you're after then any of Level Nine's text adventures will fulfil your needs, and many even come with very pretty graphics.

A good bargain is to be gleaned from Mandarin Software, and it's called the *Time and Magic* trilogy – which comprises three of Level Nine's best.

Any of the *Repton* series also provide good strategic problems but the best is *Repton Infinity*, from Superior Software.

Even though *Repton* doesn't have the instant appeal of *Tetris*, this long running series of games still has plenty to keep the more 'thought-inclined' player happy. Any game that's inspired a T-shirt, mug, pen, cartoon stript and so on must be worth at least a look.

32-BIT
TERRAMAX
GRANDSLAM



A good old fashioned adventure wins the day here. In *Terramax*, players must explore a largely underground world to find the inevitable professor and persuade him to save the world.

He fled to the caves after being the cause of some amusement when he surfaced his theory that a large asteroid would soon collide with the Earth.

Low and behold, in the best sci-fi B-movie tradition, the asteroid is later detected and a full scale search begins.

Having located the elusive professor, the persuasion comes in the form of wire coat hangers, secret formulae and numerous cups of tea! *Terramax* is not the greatest ever strategy game, but it's certainly the best so far. Good graphics too.

Runners up

There are a number of full scale strategy games, generally in the form of adventures. The best are probably from Magnetic Scrolls, having been sold by various people at one time or another.

Corruption places you in the role of a bang-up-to-date yuppie with a BMW and loadsa money – available from Rainbird. *Jinxter* is sold as part of the Hyperpack from CIS, and is the most humorous of them all.

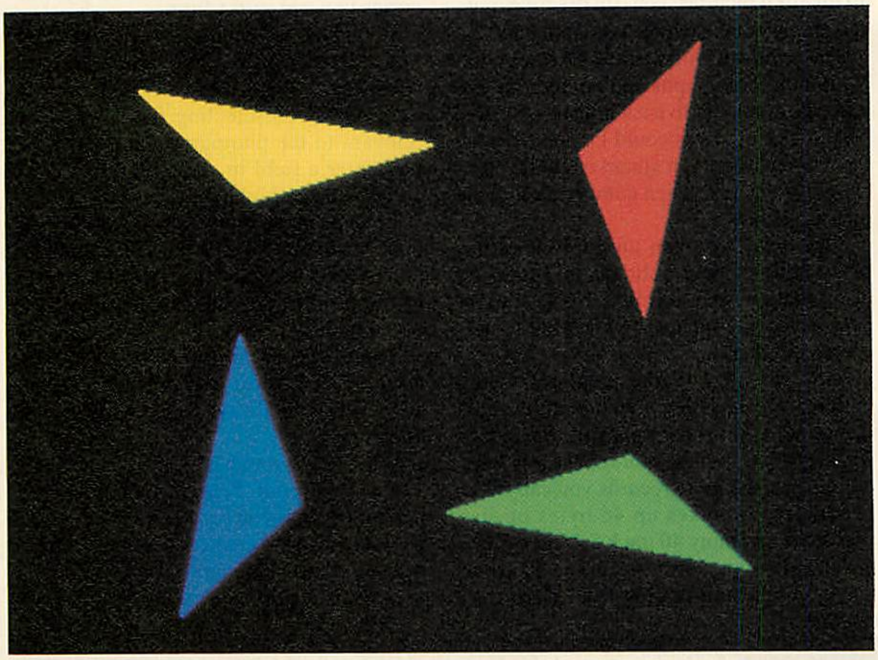
Finally, *Fish!* from Rainbird (again) is the story of an undercover goldfish on the trail of the seven deadly fins. All good fun.

What better than to finish up with the best simulation in Acorn terms.

Holed-Out (Fourth Dimension) is the urban golfer's alternative to a marble on the kitchen floor. It combines nice graphics with a good strategic element.

A short graphics demonstration program to show off the capabilities of the Archimedes and A3000 with just a few lines of Basic, courtesy of MICHAEL ATTENBOROUGH

TRIANGULATION



This is a short but pleasing graphics program in which four triangles fly around the screen of an Archimedes or A3000 in a constantly changing pattern which theoretically does not repeat for at least eight years!

The triangles give the impression of rotating in space as they move. You can choose whether the triangles are solid or whether they are primary coloured. And you can produce secondary colours where they cross, as if they were light beams projected onto a screen.

Set solid% in line 60 to TRUE if you want solid triangles or set it to FALSE for 'light beam' triangles.

You can also speed up the program by increasing the amount by which T% is incremented in line 220.

The *Triangles* program was derived from an earlier one called *Lines* and this is included on the yellow pages too.

Lines has two sheets of colour twisting and moving around the screen, and you can choose the length of the sheets of lines by changing the variable len% at line 60.

HOW THE PROGRAMS WORK

In *Triangles*, there is actually only one triangle, which is copied by rotation to give the other three. The triangle is defined by six variables, a pair of co-ordinates for each corner. All of these variables are defined by the cosine of a multiple of T%, and T% increases with time.

Each variable therefore goes through repeated cosine waves, each with a slightly different frequency.

The result of this is that although the variables all start at their maximum (so the triangles start from the corners), they soon become out of phase, and the triangles change shape and move.

The *Lines* program has eight variables defined in the same way, in order to give four pairs of co-ordinates for the endpoints of two lines.

The triangles and sheets of lines are not actually three dimensional. That is just how the brain interprets their changing shape.

The rotation of a triangle through multiples of 90 degrees to give the other three is done simply by swapping the X and Y co-ordinates and changing their signs appropriately. This is made simpler by the graphics origin being set at the centre of the screen. The large number of lines you can see in *Lines* are not redrawn each frame. Each line is drawn, left on the screen for an amount of time determined by len%, then erased. This means only four lines are drawn each frame whatever the length is.

The 'colour addition' effect given by setting solid% to FALSE in *Triangles* was achieved by use of the little-used OR plotting option – the graphics colour chosen is ORed with the colour already on the screen.

With the default 16 colour palette, each of the bottom three bits of the colour corresponds to a primary colour, so when two colours are ORed, both bits are set, giving a secondary colour.

Both programs use screen swapping, proving you do not need a major program to make this worthwhile.

The idea is you have two screen 'banks', one of which is viewed while the next frame is being drawn on the other. This means there is no flickering, even when the triangles are large and the program slows down.

The commands that do the work are *FX 112,n and *FX 113,n. These select the screen bank to be drawn to and the bank to be displayed respectively. In practice, SYS "OS_Byte" is used because you cannot put variables in star commands.

You can actually have as many screen banks as you have memory for but these programs only use two, so it needs 160K of screen memory.

The MODE 12+128 at line 70 is not strictly necessary but it prevents the program from continuing if there is not enough memory for two screen banks.

The program swaps between banks 1 and 2, the currently visible bank number being held in SCR%. Line 270 toggles the value of SCR% between 1 and 2.

The only thing you have to watch when using the screen swapping facility is the error trapping. If you are not careful, the error message and prompt will appear on one bank while the screen displays the other, giving the impression of a fatal crash. For this reason, there is a *FX 112,0 and *FX 113,0 in the error trap.



Sooner or later, all professional photographers and even just avid amateurs find their collection of photographs becoming too large to just 'flick' through in search of a particular picture. Newspapers and magazines (including *BBC Acorn User*) need to file away their photos so when they need a picture of, say, the Queen holding a baby, they can go straight to it without spending hours on the task.

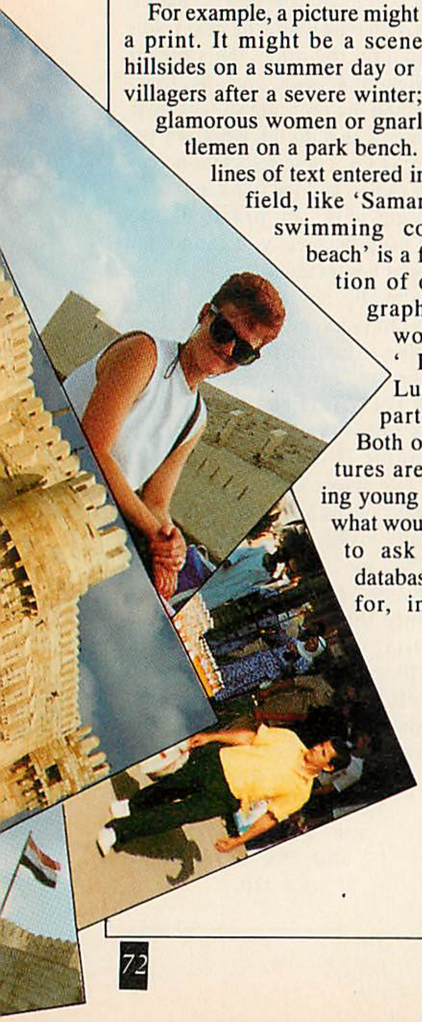
A professional photographer's collection of images can contain thousands of items – slides, prints, negatives – and when he needs to submit a photo on a specific subject, the last thing he needs is to sit for hours slaving over a hot lightbox looking for that 'cute' picture of a baby goat he took back in 1982.

The obvious solution is computerisation and some kind of database holding details of all the pictures he has.

However, conventional databases operate similarly to a sophisticated address book. This would be fine if every photograph had an easily memorised name, which the database could search for.

Unfortunately, this is rarely the case, so there is a need for something which 'categorises' photographs as to their actual content, rather than just a name, however descriptive it may be.

For example, a picture might be a slide or a print. It might be a scene of rolling hillsides on a summer day or snowbound villagers after a severe winter; it could be glamorous women or gnarled old gentlemen on a park bench. One or two lines of text entered in a database field, like 'Samantha Fox in swimming costume on beach' is a fair description of one photograph. So, too, would be 'Linda Lusardi in party frock'. Both of these pictures are of charming young women but what would you have to ask a normal database to search for, in order to suggest both of these pictures to an editor looking for a cover picture for a new fashion magazine? *Fotofiler* is a database manager designed especially to overcome this dilemma.



It has 98 ready-made 'fields' which represent the kind of subjects people photograph most often. Using these fields, in a similar manner to the way the police build up Identikit pictures, you can describe quite accurately what each picture contains.

This is how it works. First, take your collection of photographs and number the lot. Allocate a number to each holder – the blue plastic box of slides could be number one, the white photograph album could be number two and so on. Then number each of the pictures inside.

This done, you can uniquely identify, say, a slide of your holidays in Turkey as being Picture No.7 in Holder No.4. You can now locate any picture by knowing its reference number.

Next, run the *Fotofiler* programs. Using option 5, create a file for your pictures. This does not need to use up a full disc, as in some systems, but the more space you have on the disc, the more records you can store.

Each record takes up 48 bytes of disc space. So, an empty 40 track 5.25in disc can hold well over 5000 pictures; 80 track drives more than double that. Hard disc users can store the details of more pictures than the mind can comfortably conceive.

Back to the menu. Use option 1 to enter the selection screen. For each new record, enter a Holder number, Picture number and a title. The title need not be anything other than a general description of the image, something like 'Granny's birthday party'. The screen then fills up with the 98 categories you can select from.

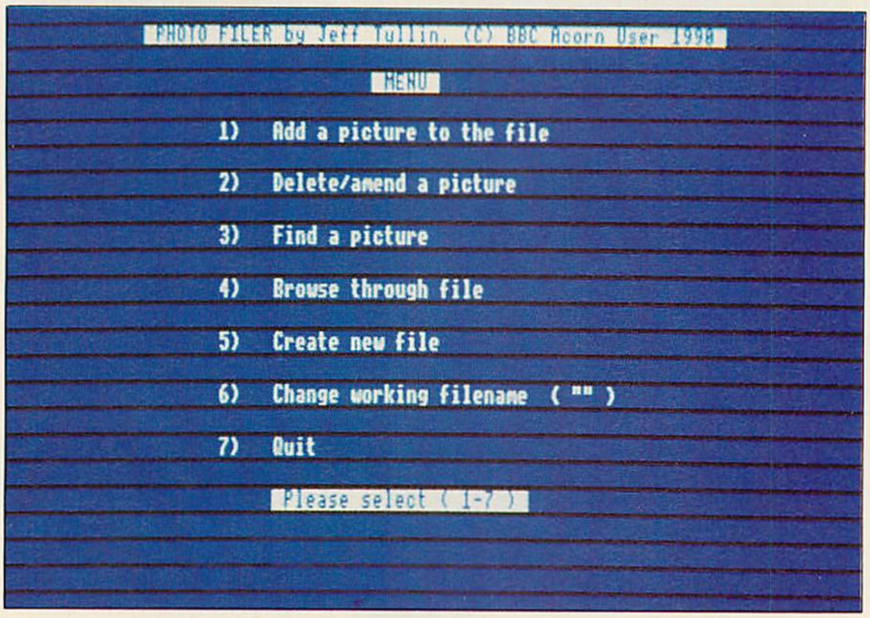
If the image contains men, use the cursor keys to position the brackets around the word 'men'. Press Y and the field will highlight. Carry on selecting fields which are relevant to the photograph in question. If you enter a field in error, simply press N and it will 'un-highlight'.

Enter as many fields as you possibly can, to better define the picture. Once the selection process is complete, press E. Answer Y to the prompt and the picture details are saved to disc.

The program continues to prompt for more records until you press the ESCAPE key. This will always take you back to the main menu.

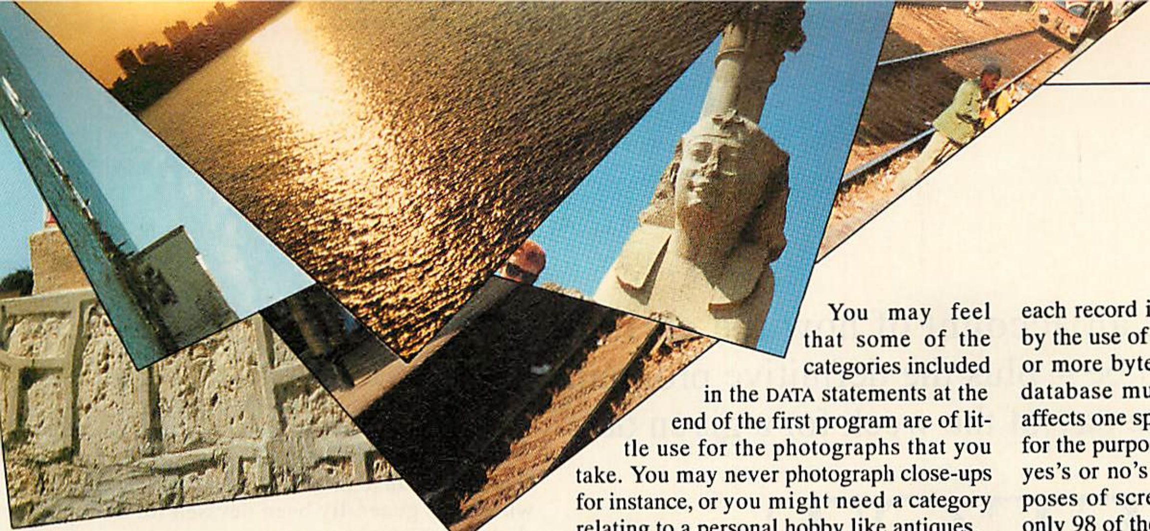
When your database has been created, you can try it out. Select option 4 from the main menu and you can browse through the records you have created, using the left and right cursors to change screens.

Option 3 allows you to find records



Now you can have all your photographs, or indeed anyth

TAKE



You may feel that some of the categories included in the DATA statements at the end of the first program are of little use for the photographs that you take. You may never photograph close-ups for instance, or you might need a category relating to a personal hobby like antiques.

Simply change any word not required for something more suitable. Your new title, however, must contain nine characters, even if some of them are spaces, so the screen display will line up.

This flexibility means you could alter all the fields and use the program for something completely different. Using words which described physical characteristics, a model agency could keep a database of its models, with fields covering hair and eye colour, height, measurements, etc.

How about a file made up of animals' names. A record titled 'Iguana' would have selections made in fields called 'Lizard', 'Scaly', 'Coldblood' and so on, which children could use in the classroom for biology lessons, emulating Linnaeus's work in the classification of species.

For the technically minded, the program manages to store all this information about each record in only 48 bytes of disc space by the use of bit logic. Instead of using one or more bytes for each field, as a normal database must, the 'state' of each field affects one specific bit of 13 bytes set aside for the purpose. This means that 13x8=104 yes's or no's could be stored. For the purposes of screen layout, the program uses only 98 of these bits.

All the machine code and data for the screen display is stored above HIMEM, which is lowered by the program for this purpose.

So too is the current filename and the 13 bytes used to flag the various fields.

The routine which prints out the fields polls each bit of these bytes in turn and so decides, depending upon their condition, whether or not to highlight them as they print.

This could have been achieved in Basic but early versions of the program proved annoyingly slow in operation, so my apologies to anyone who finds assembly code daunting.

You should save part 1 of the program as 'FOTO' and part two as 'FILER'. Part 2 is chained by part 1.

And there you have it. If, as they say, a picture is worth a thousand words, you need never be lost for words again!

which fit a particular description. This is where *Fotofiler* comes into its own.

Once again, you will be presented with the 98 categories. In the same way as before, enter those fields that you are interested in. The fewer fields you select, the more records will match the description. As an example, if you were to select only the field 'Animals', then a photo of your tabby cat would certainly qualify. If you selected 'Animals' and 'Wildlife', then it probably wouldn't (unless your cat's like mine).

Select 'Fish' and Tiddles is right out. Select no fields at all and every record in the file will be printed.

Type E to end your selection, answer Y or N to the prompt 'Output to printer?' and watch the records print out.

You can amend the records in the file using the reference numbers you gave them for the Holder and Picture positions, using option 2. This option also allows you to change the title if you wish.

If you delete a record, its holder number becomes -1 and it is afterwards ignored by the searches. The space it leaves can be reclaimed later by using option 2 to alter a record, giving -1 as the holder number and 0 as the picture number. You will then be allowed to alter the first deleted record the program can find.

Once you change the holder number from -1 to any other number, the record is recognised again. In this way, users of single drives do not have to worry about compressing a file they have deleted several records from.

Owners of Basic 1 machines will need to replace the keyword OPENOUT with OPENIN to make the Basic program work. In addition, as the assembly language section contains some Basic 2 specific instructions like EQUB, that would need conversion too, using some of the many published functions which simulate these commands.

Otherwise *Fotofiler* is compatible with all BBC machines without modification.

Ready-made 'fields' representing subjects people photograph most often







Fotofiler helps find just the picture you're looking for

g else. Keep your snaps at your fingertips, with this filing system from **JEFF TULLIN**

YOUR PIC

MICHAEL LEETE gives an account of how the current calendar came to be – plus the definitive program that calculates the day of the week for a given date

PERFECT TIMING

Since the beginning of home computing a number of utilities have been published to calculate the day of the week for a given date. All the programs that I have ever seen have been flawed, because they rely on a formula which has generally been devised for a slightly different purpose.

What's more, the operation of the formula masks the mechanics of the program, so the user cannot make any personal modifications. Also, the programmer cannot adapt it to cope with the whole of the Christian epoch.

In a few cases, it has been clear that the programmer has not understood, or even been aware of, the changes that have been



CLIVE GOODYER

made to the calendar since Julius Caesar first gave his name to the Reformed Imperial calendar.

In the development of the calendar throughout the world there is a fascinating history and the philosophy and mechanics of the measurement of time are vast and absorbing subjects.

Luckily, the calendar we know, despite its imperfections, is the one most widely used in the world today and it has only been subject to two corrections during the years Anno Domini.

The later change took place in England following an act of Parliament of 1750. The earlier change affected only the first eight years of the epoch.

From the fourteenth century, the last day of the year had always been on 25th March, corresponding to the Roman military year. However, the year 1751 was shortened by three months so that it ended on 31st December.

This change had no effect on the calendar, as such, although genealogists and historians have adopted the convention of writing dates in January to March as, for example, 20th January 1750/51, to identify the historical year precisely.

So, any good genealogical database must take account of this convention, otherwise infants may appear to have died before they were born!

In the following year, 1752, the Gregorian calendar proposed by Pope Gregory XIII in 1582 was implemented so that 3rd September became dated 14th September. This brought England into line with most of continental Europe where the Gregorian calendar had been adopted at various dates up to about 1700.

Late though we were in England in 'modernising' the calendar, the Orthodox Church in Greece held out until 1923 and at Foula, in the Shetlands, Christmas and Hogmanay are still celebrated in accordance with the Julian calendar.

Care must also be taken when comparing European dates. On the face of it, Cervantes and Shakespeare died on the same day on 23rd April 1616. But this is not, in fact, the case. Cervantes died in Madrid, where the Gregorian calendar had already been applied, so he actually predeceased Shakespeare by 10 days.

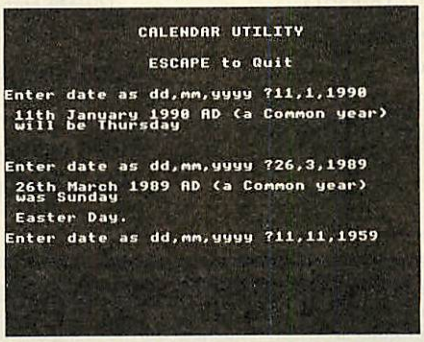
The whole concept of anniversaries is confusing. Christmas has been on 25th December through thick and thin but Easter Sunday is fixed as a sort of lunar anniversary and caused several centuries of bitter dispute.

On a more mundane level, the battle of Hastings was fought on Saturday, 14th October but its anniversary is held annually on 20th October.

In 532AD a monk named Dionysius Exiguus (Denis the Little in translation) calculated that the Christian epoch began on 25th December 1BC. In fact he was working from the Annunciation and Pope Gregory back-dated the era and, of course, modern historians can show that he was wrong by several years.

Before 532AD and, strictly, before the Synod of Whitby in 664AD, Christian dating had followed several systems which all add to our confusion except that they related, indirectly, to the Roman notation of dating – Ab Urbe Condita (from the foundation of the city).

The first year of the Julian calendar was 45BC or 709AUC. The year 708AUC had had intercalations of 80 days to re-align the seasons. The intention was to make every successive fourth year bissextile, that is, a



Leap year. Evidently 712AUC should have been the next Leap year but the most famous Ides of March of all time fell in 710AUC and the unsupervised Senate, being accustomed to counting inclusively or unable to divide DCCXII by IV, ordered Leap years every three years.

This discrepancy persisted until Augustus Caesar put the Senate, and the calendar, right between 746AUC and 750AUC.

For this service, Augustus claimed the sixth month, Sextilis, for himself and added an extra day so that Julius Caesar would not be remembered by a longer month than himself.

His intervention has been a mixed blessing. He upset for all time the regular alternation of 30 and 31 days in the months (except February) but at least he changed his name from Octavian so that we do not have two months abbreviated to Oct. Without him, of course, we would have had a month of Sex!

In the development of the modern Gregorian calendar, there is a fascinating history

As far as concerns the program, which will not accept dates before 1st January 1AD, Augustus had ordered there should be no intercalations until 8AD. In other words, none of the years 1AD to 7AD inclusive, was a Leap year.

The earliest date I can trace in the Anglo Saxon Chronicles is from the Laud Chronicle sub anno 626AD. In effect it says that King Edwin was baptized at Easter (Sunday) on 12th April 627AD. There is also a surviving dedication stone from St Paul's, Jarrow giving 'VIIII K1 Mai in the 15th year of King Ecgfrith' (23rd April 685) as a Sunday. Easter Tables for earlier years do exist but I do not have access to them.

THE PROGRAM

The example program in the yellow pages is based on a 28 year cycle, known as a Solar Cycle. The sequence of numbers in the DATA statements represents the day of the week, from Sunday (0) to Saturday (6), of New Year's day in a series of Julian years, with the addition of 'C' for a common year and 'L' for a Leap year. This technique simplifies the process and avoids complicated multiple calculations to determine which years are Leap years.

Any corrections are effected by moving the 'pointer' along the data so the basis of the program is very simple indeed.

Similarly, the first day of the week of every month bears a fixed relationship to New Year's day.

This relationship differs, of course, between Leap and common years.

To calculate the day for any given date, all the program has to do is simply point to the correct place in the Solar Cycle for the year requested, and augment the resulting New Year's day by the appropriate 'index' for the month and the number of days into the month.

At the end I have placed PROCeaster to demonstrate how the program may be customized to cater for your own special dates. The particular formula used in the program was produced anonymously in 1876, and is far easier to program than the Golden Numbers or the Epact.

It is also most fitting that a calendar utility should concern itself with the date of Easter. The controversy surrounding it caused the calendar to be minutely examined and when the monks had to make their own calculations, the preparation of an Easter Table was called 'computus'.

Recommended further reading: Time in History *by G J Whitrow. Oxford University Press 1988.*

Swift Software

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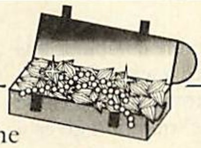
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SWIFT COLLECTION 1
CRAZY CAVES

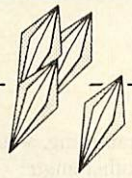


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SWIFT COLLECTION 3
Scramble/Diamonds



Scramble is a variation of the popular arcade game where you must avoid the rockets and collect the fuel pods whilst keeping clear of the rough terrain. While **Diamonds** offers many screens of Repton-like puzzles to master. If you liked the Repton series, you'll love this game. ***Quick reflexes, skill and ingenuity are the only way you'll beat these games.***

SWIFT COLLECTION 4
EDIT 90

EDIT 90

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The last programming language to come under the scrutiny of Neil Sykes is MicroProlog

USING YOUR INTELLIGENCE

When looking at Logo last month, we noted it offered the possibility of storing data as lists. This had the potential to simplify the writing of databases. We now look at a language which exploits list structures to the full – MicroProlog.

MicroProlog, as its name implies, is a 'cut down' version of a language called Prolog. This language was developed to enable 'PROgramming in LOGic' – programming according to natural human thought patterns, rather than the slightly artificial syntax of more conventional computer languages.

That sounds great, but the bad news is that this 'economy' version of Prolog has syntax rather more obscure than Basic or Pascal. The good news is that you don't actually have to learn it.

With MicroProlog comes a collection of 'extension' packages, which themselves have become part of the standard. Unlike a C or Pascal library, which provides extra functions which you use in the same way as any other part of the language, MicroProlog's extensions totally change the syntax of the language so you need never be aware of its complexity.

The idea behind this is to make the language available to a variety of users from professional programmers to primary school children. The user can work at any level he or she wishes.

Among the extensions available are *Simple*, which allows programming in an English-like syntax, and *Mitsi*, a question-and-answer based syntax which was originally designed for schools.

A number of the books on MicroProlog assume the use of the *Simple* package, not covering the standard syntax at all.

It is possible to write efficient working programs in *Simple*, although the package will often use up memory and slow down the machine.

In this article, we will use *Simple* to familiarise ourselves with the ideas behind the language.

The basis of MicroProlog is the matching of patterns. One of the most basic patterns in the English language is a three-word sentence with a verb in the middle. For example:

```
dogs eat meat
roses are white
this looks interesting
```

We can teach MicroProlog these facts:

```
add(roses are white)
```

will store the fact that roses are white. To extend this somewhat narrow view of horticulture, we can go on:

```
add(roses are red)
add(roses are yellow)
add(violets are blue)
add(daffodils are yellow)
add(poppies are red)
```

and so on. Having given the computer this information, we now need a way of retrieving it. The main tools provided for this are 'is' and 'which'. The 'is' question gives a straight yes/no answer:

```
is(violets are red)
NO
```

Although the syntax is diverging from strict English here, the meaning is fairly clear. If you're not sure what colour roses are, you can use 'which' instead:

```
which( x : roses are x )

red
white
yellow
No (more) answers
```

Without any more programming, you can ask the question from another angle:

```
which( y : y are yellow )

roses
daffodils
No (more) answers
```

So far, the data we have looked at has been of the form 'x something y' – where the 'something' is properly called the 'relation name'. *Simple* also allows another form, called the 'prefix' form. An example of this is:

```
add (are (marigolds yellow) )
```

Simple will allow you to enter this but when you list all the data with the command 'list are', you will see it in the form we started with (called 'infix form').

With our flowers, the prefix form looks odd. Some data fits it better:

```
add(car ( Vauxhall (Nova 1300) )
```

being more natural than:

```
add(Ford car (Granada 2900) ).
```

Although 'is' and 'which' are the only direct queries allowed in the *Simple* version of MicroProlog, you can extend their scope by defining 'rules' about the data. Here is an example of a rule:

```
add( Y economical if
   car (X (Y Z)) and Z LESS 2000)
```

Assuming the sort of 'cars' defined above, typing:

```
is(Nova economical)
```

should give the answer YES, while:

```
is(Granada economical)
```

will reply with NO. The command 'which' can also be used to produce a list of economical cars by asking:

```
which(x : x economical)
```

Of course, the computer can't be expected to know everything. Sometimes it will need to ask questions while looking at the facts. To enable this, another facility, 'is-told', is provided. Here's an example of its use. Suppose you have the information:

```
car(Ford (Granada diesel))
```

in memory. This diesel car will be more economical but you will have to ask your miserly customer if he minds having a diesel car. You can therefore rewrite 'economical':

```
add(Y economical if
        car (X (Y Z)) and
        (either Z LESS 2000 or
Z EQ diesel and is-told (Is a diesel OK) ) )
```

counting the brackets carefully! The effect of this will be that the program will stop and ask 'Is a diesel OK?' if it finds a car with an engine bigger than 2.9 litres but only available as a diesel.

Your 'economical' program is now a little more complicated, but as far as the user is concerned it has not changed – you can still ask:

```
which(x : x economical)
```

the only difference will be an extra question every now and then.

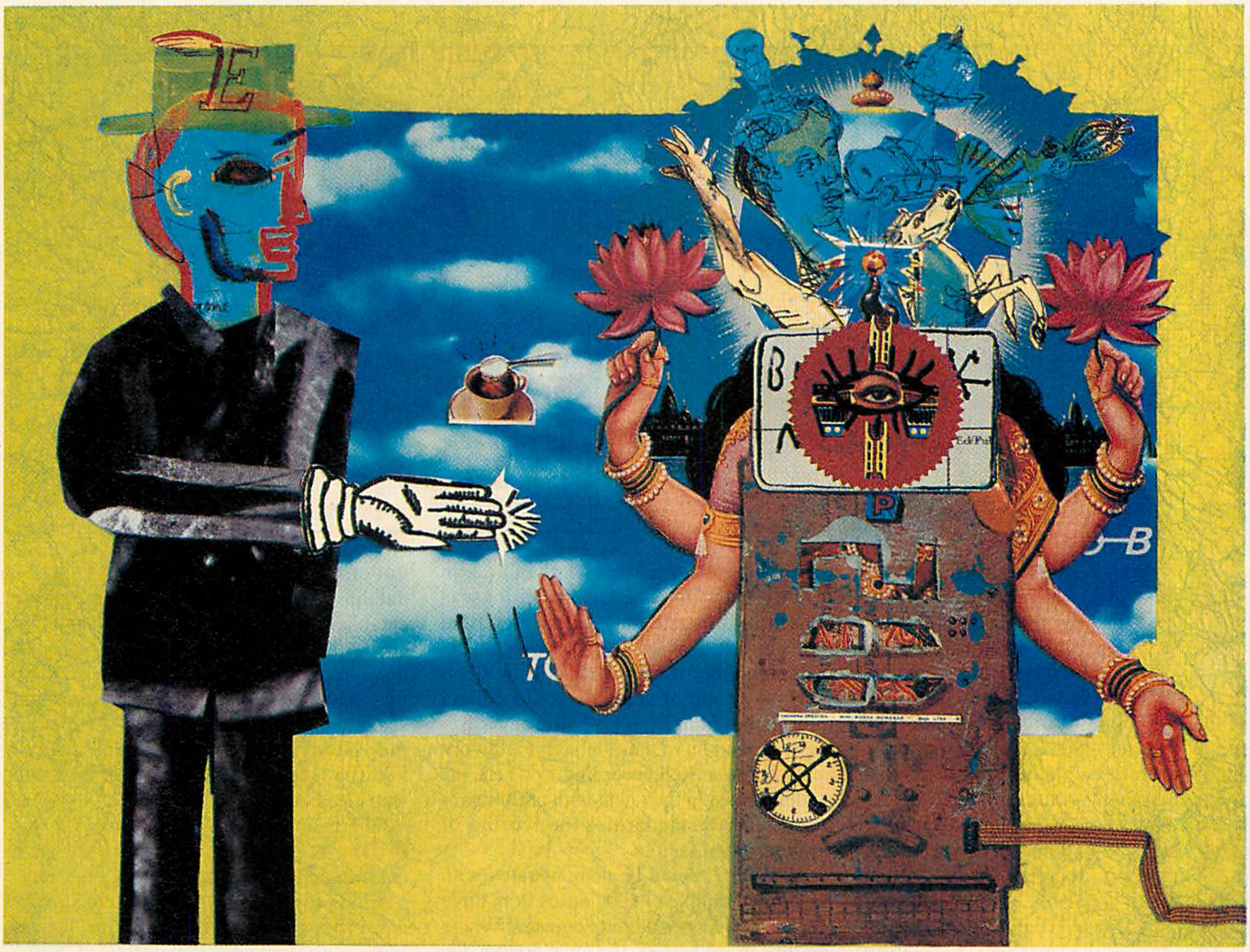
We've now looked at the *Simple* version of MicroProlog but what about the standard version? How does it differ and what is the point of using it at all?

The first question can actually be answered rather easily. Note how we earlier used 'list are' to produce

```
roses are red
violets are blue
```

and so on. Well, 'list' is part of the *Simple* extension package.

A similar command exists in standard MicroProlog but it is written in capitals.



Therefore, if you try:

```
LIST are
```

you will get:

```
((are (roses red)))
((are (violets blue)))
```

This less poetic version is what is really stored in the memory.

Simple is a compiler. It takes your sentences and translates them into standard MicroProlog. From this you can see that 'prefix form', as we called it earlier, is compulsory in MicroProlog – our more English-like 'infix form' is a luxury provided by *Simple*.

As for the rule 'economical', listing its compiled form gives you the following:

```
((economical X)
  (car Y (X Z))
  (OR ((LESS Z 2000)) ((EQ Z diesel) (is-told Is
a diesel OK))))
```

Comparing this with the *Simple* version, you will notice two major differences: first the use of prefix form and secondly that the 'and' and 'if' statements are missing.

In essence, when MicroProlog is presented with a list like this, it will try to match every element of it. To do this you type:

```
?((economical Granada))
```

This asks it to match the list. Having found the definition of 'economical', it sets X to 'Granada' and continues down the list. It then meets 'car Y (X Z)' which in this case becomes 'car Y (Granada Z)'.

It will then look for a sentence fitting this pattern, eventually finding 'car Ford (Granada 2900)' and setting Y and Z to Ford and 2900. Carrying on, it checks the OR condition, finding that 2900 is not less than 2000 or equal to 'diesel', so it backtracks to 'car Y (X Z)' and looks for another solution.

Eventually it finds 'car Ford (Granada Diesel)' and continues, finally succeeding or failing on the result of the 'is-told'.

This process will, if successful, result in nothing at all being printed on the screen! You have to specify this yourself:

```
?((economical Granada)(PP Yes))
```

If the Granada is found to be a gas-guzzler then the response will be a terse '?'.

The complexity of the above and the need to specify every detail puts most people off 'raw' MicroProlog. This is why *Simple* is provided and it is feasible to use it exclusively, as I mentioned earlier.

However, using standard syntax gives you more freedom and more speed. It also allows access to facilities for programs to learn from their mistakes – the main reason for MicroProlog's popularity as a language for artificial intelligence programming and expert systems.

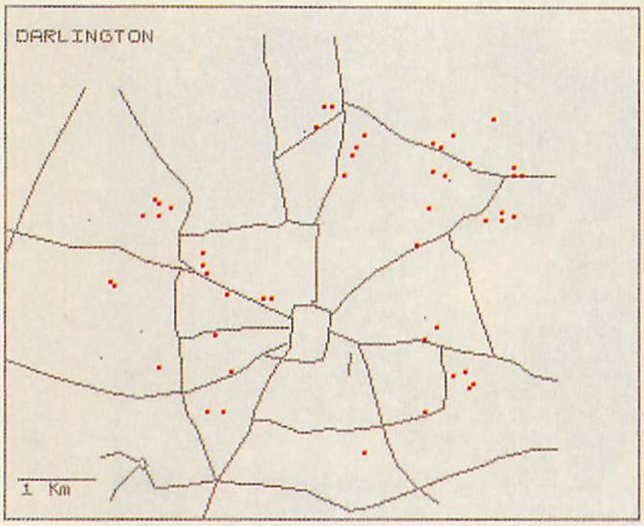
By far the best way to learn MicroProlog is to start with Simple *and gradually pick up the standard version by examining compiled versions of programs. If you really want to dive in at the deep end, one good book to help you is* Programming in MicroProlog *by Hugh de Saram, published by Ellis Horwood.*

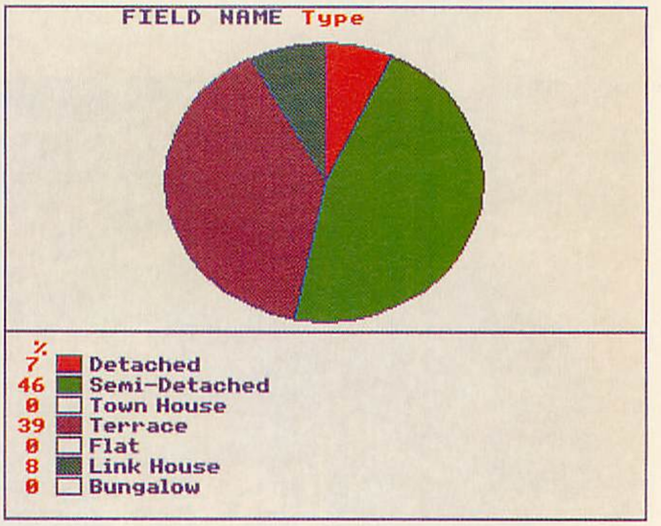
MicroProlog is quite unlike any other language we have looked at in this series including mavericks such as Forth and Logo. The result is you will probably find either that it is just what you've been looking for or you will recoil in horror.

I have to admit that the first time I encountered it, I wasn't too impressed. However, it's an interesting language to explore and it looks likely to become even more important in the future.

**MicroProlog is available from Acorn as a 16K Rom and 5.25in disc for the BBC micro and Master series at £79.95.*

There isn't an Archimedes version but a full implementation of Prolog (Acorn's Prolog X) costs £228.85.





IT support teacher, **MICHAEL RUDD**, shows how a data handling package can liven up a geography class

KEY TO THE DOOR

A data handling package is an ideal starting point for geographers wishing to incorporate IT into their curriculum. Pupils may search or 'interrogate' a database of local, national or global information. Then they can test out ideas and search for patterns, with output in lists, pie charts, bar graphs, scattergraphs and various statistics. Greater understanding of the topic and the database comes when students are involved in the latter's creation, deciding on the fields, designing data collection sheets, gathering information, entering data, interrogating the datafile and then perhaps evaluating and refining it.

As an IT support teacher for secondary geography I have tutored a series of two-day courses for teachers on databases. I decided to use ITV's *Key* package because of its low cost, graphical output, ready-made datafiles, the range of statistics suitable for primary to A level students, but chiefly because of its map feature.

A data handling package with map facility using the number crunching and graphics of the computer promised to provide a real enhancement of geography teaching. Reviews of *Key* suggested that the map facility was difficult to use and few teachers would use it. However, careful reading of the handbook and helpful advice from GSN Software overcame any difficulties.

My course aims were to give teachers confidence in using the package and designing datafiles and associated maps for direct use in their schools. I also hoped to impart to them the skills to involve their students in actively learning geography with computers.

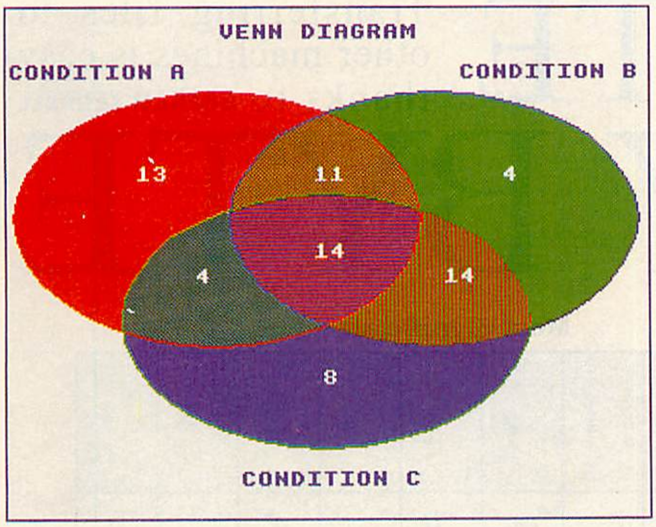
To give some structure in the first part of the course, I decided to adapt a GCSE Geographical Enquiry I had used previously in school, as a demonstration. The topic was based on the collection of house prices for Darlington, the largest urban area in County Durham. The file structure was chosen to illustrate most of the *Key* field types and to involve a variety of skills, including basic map work and some fieldwork. A group of students could collect information from a week's house advertisements and add it to the database. Fieldwork could be organised according to where the students lived in the town, with preliminary discussion to standardise the scoring of environmental factors.

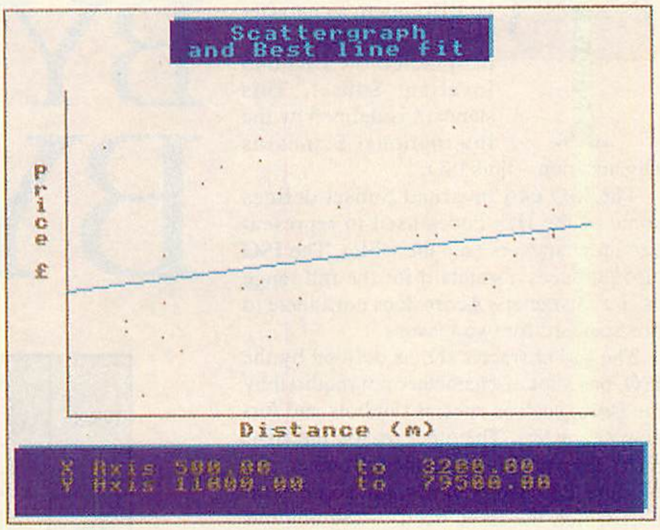
What ideas could be demonstrated with the limited sample of 100 houses from three weeks' newspaper advertisements? Where are the terrace houses, the town houses, the houses without garages? Housing patterns may be investigated and ideas quickly tested. Houses for particular family situations may be sought, with any search displayed on the map.

Students should be able to calculate means, construct a pie chart, venn diagram, bar graph or scattergraph before using these facilities on a database. Spearman's rank correlation co-efficient and Chi-squared should only be employed by those who understand them. However, using a database removes the need for repetitive calculations and laborious graph drawing, and with *Key*, the tiresome construction of distribution maps is avoided. Instead, time may be spent on looking for patterns and seeking explanations for them. Anomalies may be investigated by a careful 'search' and the interpretation of the graphs and statistics is improved.

The main assignment of my course was for the teachers to produce their own datafile and related map. I had given suggestions for datafiles for different student age groups and had been able to discuss ideas with the teachers beforehand. Some teachers worked to a common format so that information on shopping centres or house prices for different parts of the county could be exchanged. Appropriate field types were chosen from the 11 available on *Key*, and the structure of the datafile was worked out.

Acetate copies of the maps were placed over the monitor screens and roads, coastlines, country boundaries and buildings were traced around with the cursor keys.





Another program *Key Utility Two*, was used to add titles and labels. Grid lines were drawn over the printout copies of the maps and co-ordinates for locations were worked out and entered into the datafiles. There was time at the end of the course for some evaluation of the datafiles and the use that could be made of them.

The datafiles now in use, or being developed, reflect the range of scales and age ranges involved: housing (with the addition of age of building) on town maps; shopping centres of various scales; litter surveys on maps of schools and surrounding housing; holiday destinations on a map of Europe with an inset map of the British Isles; leisure facilities on a map of the county; migration into Wolsingham on a map of the county with an inset map of the British Isles; journeys to school on maps of the schools' catchment areas; census data at enumerator district level; natural disasters on a map of the world; and data on population and development on a world map.

There are many other possibilities: vegetation and soil information may be plotted on a block diagram or cross-sectional diagram; a class collection of food labels may be classified and the source areas plotted on a world map; weather data for the British Isles and the world from daily newspapers may be analysed and the stations located on appropriate maps.

The working out of co-ordinates for the 'map' or block diagram, and relating the atlas map, Ordnance Survey map or street map to the screen map, uses the basic map skill in a purposeful way, rather than as an arid exercise.

For analysing distributions it is not possible to find the centre of gravity directly from the *Key* map co-ordinate field, but if the X and Y co-ordinates are entered into separate numerical fields, the means of the co-ordinates of a search may be calculated. Thus the centres of gravity of different functions in an urban centre may be found.

There is much scope for co-operation between schools in an area, if the structure for a database can be agreed. In some cases the datafile is best researched and compiled centrally, for instance I hope to provide County Durham schools with datafiles on opencast coal workings and a survey of all village services in the county. If schools or LEAs across the country could co-operate, students could test ideas about the 'North South divide', for example.

The map facility is also proving of interest to history teachers, particularly maps of early local census information, maps related to datafiles of colliery disasters and maps related to local place names. Science teachers could also use the facility when dealing with environmental issues.

There are many *Key* datafiles from ITV, some linked with television programmes. Special mention should be made of the *Cities* datafile. This has built-in maps and 1981 census data at ward level for eight cities in the United Kingdom.

The *Key* data handling program will certainly find a place in my future teacher courses, integrated with problem solving and simulation programs. I look forward to other datafiles from ITV and *Advanced Key* on Archimedes will no doubt have more sophisticated map facilities. Meanwhile, the use of *Key* in County Durham comprehensive schools is now on a *Key* datafile, keyed into a corresponding map of course!

USING THE KEY DATABASE FOR MAP WORK

Use side two of the *Key* disc for the data and map, if using the single disc drive. 'Create a data disc', leaving one 10K block of memory for the map. 'Reserve' the rest (usually eight blocks) for the data. Choose the four colours for the map: 0 for background, 3 for map lines, 1 and 2 for locations. It is probably wise to give the map a short name at this stage.

Measure the rectangle that comes on the screen (230mm x 187mm on my set up). Photocopy the map down to this size onto acetate. Fix this over the screen. With the help of the cursor keys, draw the lines, then fill in areas of colour.

The map may be edited at any future date. A Grafpad or AMX Mouse may be used for drawing.

Create a datafile of the co-ordinates around the edge of the map (0 - 159 horizontally, 0 - 127 vertically in steps of 19). 'Search and Sort' this datafile, 'display' the map and print it.

Join the co-ordinates to produce a grid which may be photocopied onto acetate and used for any *Key* map on the same equipment. If the grid is from a screen 'grabbed' with *Snatch*, it may be enlarged to fit the original map used for the screen acetate map.

Use the grid to work out the co-ordinates for the datafile records. Enter them into the datafile, choosing the colour required at the same time. On displaying the map, locations too close to each other or located inaccurately may be noted and the co-ordinates in the datafile may then be changed.

Mapfiles, including those on purchased datafile discs, may be copied for use with other datafiles. *Key Utilities Two* allows such maps to be edited.

Schools should have information about *Key* on *Information Technology*, an ITV Schools broadsheet available from the ITV Association, 6 Paul Street, London, EC2A 4JH. *Key BBC* is priced at £7.95, *Key 128* (ADFS version) costs £8.95 and *Key Utilities Two* is £8.95. The *Placenames* datafile costs £2.45, while the *Cities* datafile £11.44.

BYTE BY BYTE

Transferring files to other machines is easy thanks to **GRAHAM KENDALL**

The BBC micro's character set is based upon a standard called the ISO 646 Invariant Subset. This standard is defined by the International Standards Organisation – thus ISO.

The ISO 646 Invariant Subset defines some of the Hex codes used to represent certain characters (see the table). The ISO also produces a standard for the full range of Hex characters. Acorn does not adhere to this standard for two reasons.

The full character set, as defined by the ISO, has a lot of characters not required by the Beeb, such as special symbols and foreign characters. The other reason the BBC micro does not adhere to the full standard is because this does not include some symbols which the Beeb needs – the obvious one is the pound sign.

So, Acorn decided to use the ISO 646 Invariant Subset. As many characters as possible were used and finally a few extra codes were added to make up the BBC character set we know.

Having a character set that is different to other people's is not a problem as long as you work solely on our BBC micro or just transfer data between BBC machines.

The problem comes when you want to transfer data to another computer using different Hex codes. Even if the machine receiving follows the ISO 646 Invariant Subset (Right) it does not mean all Hex codes will be the same.

So, if you are transferring data from one type of machine to another you will probably have to use some sort of conversion.

For example, to transfer a file between a BBC micro and an ICL mainframe you need to convert from BBC Ascii to the ICL EBCIDIC standard.

This involves converting characters such as upper case A. The BBC micro sees the letter A as &41. The ICL machine recognises an A as &C1.

The program in the yellow pages will carry out this conversion by reading a file containing BBC Ascii representation and producing another file containing ICL EBCIDIC characters.

The conversion codes are held in the array, trans%, read from the DATA statement. The incoming byte is used to reference this array and convert the byte to the correct Hex code. For example, if the incoming BBC byte is &41 it will be converted to &C1 by using the value &41 to reference the trans% array and convert the byte to the value stored there.

The machine you are transferring to will dictate which Hex codes you place in the DATA statements but by using this program you can convert any BBC file to codes understandable to any other machine that uses eight bits to store a single character.

Most Significant (columns) / **Least Significant** (rows)

HEX	0	1	2	3	4	5	6	7
0			Space	0		P		p
1			!	1	A	Q	a	q
2			"	2	B	R	b	r
3				3	C	S	c	s
4				4	D	T	d	t
5			%	5	E	U	e	u
6			&	6	F	V	f	v
7			'	7	G	W	g	w
8			(	8	H	X	h	x
9			)	9	I	Y	i	y
A			*	:	J	Z	j	z
B			+	;	K		k	
C			,	<	L		l	
D			-	=	M		m	
E			.	>	N		n	
F			/	?	O	_	o	

Archimedes Shareware Discs

Here is a selection from the range of public domain program discs for the Archimedes produced by Norwich Computer Services, publishers of ARCHIVE the Archimedes subscription magazine.

Shareware 5: Fifty-one pieces of music for Maestro.

Shareware 11: Six concerti in Maestro form.

Shareware 12: Rubik's cube, BASIC compressor, Sinclair QL disc reader, Central heating calcs, Making cassette inlays, Floppy drive speed test, Address book.

Shareware 13: Hard disc backup, Rubik's clock, Interrupt module, Dustbin, Outline processor, Mandelbrots, Video database, Calendar, Golf.

Shareware 14: 'Arctist Plus' – 256 colour art package.

Shareware 15: 14 graphics demos, 2 !Draw fonts, 6 !Maestro tunes, 20 Sampled sounds.

Shareware 16: (another) 256-colour art package, link to Psion organiser, YAIG-2 game (works in the overscan).

Shareware 17: *Acorn's RISC-OS extras disc: new printer drivers; new version of !65Host; improved NetFS, NetPrint, NetFiler and NetStatus; IRQ latency fix; new hourglass and sound modules; WimpUtils module; new Clib (3.50), Colours (0.52) and FPEmulator (2.80).*

Careware 1: Calendar, Label printer, "Make" utility, Othello, Sliding block puzzles, Simon, + demos & games.

Careware 2: Asteroids, Backgammon, Fractal curves, Desktop Calendar, ARM disassembler, Disc editor (ADFS/MS-DOS), BASIC editor icon, BASIC program compressor.

Careware 3: Breakout, Fruit machine, 3D O's&X's, Forth language, HD backup, Graphical file dump, 'Exam-ine' for MS-DOS, and (another) icon for BASIC editor.

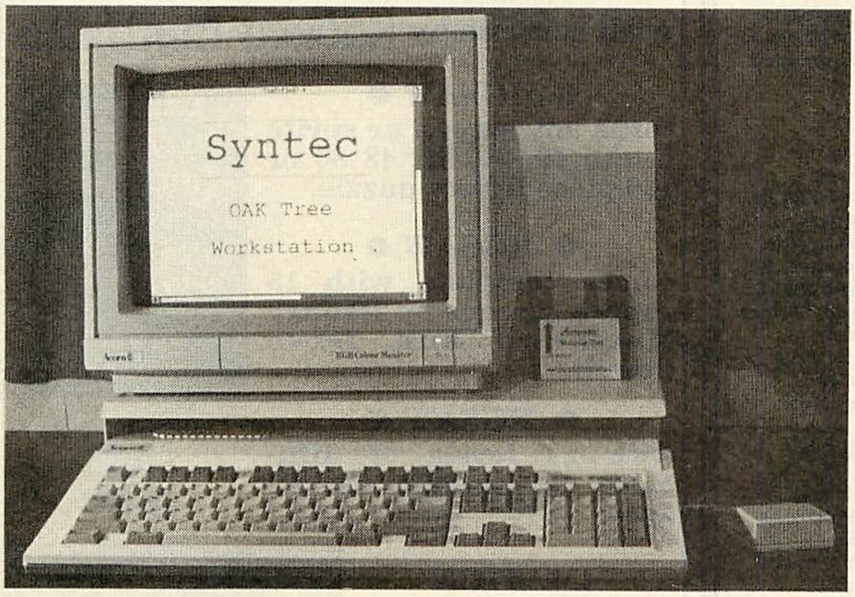
Careware 4: Graphics animation by Malcolm Banthorpe, serial link to BBC micro, dustbin, !PCdir – transfer to and from MS-DOS, screen blanking routine, WP file con-version routines, function key strip printer, some more tunes for use with Maestro and some desktop demos.

Careware 5: *Printer buffer module, Sinclair QL utilities, four overscan screen modes, Presentation program (bar charts, pie charts, line graphs, etc), Teletext screen editor, BBC font designer, key strip editor, 32,768 colour demo, GMA demo, poker, quartet (desktop game), Simon.*

Shareware – £3.50 each, Careware – £7 each (£6 of which goes to charity).

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R, BL, GR, BR	4.90	4.60	4.25
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If the ribbon you require is not listed please let us quote.

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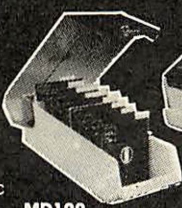
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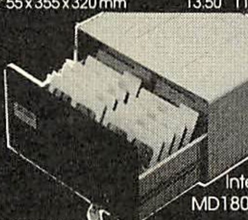
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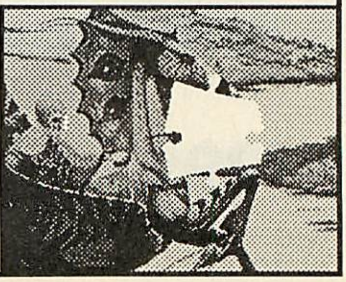
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– The Micro User, Dec' 89.

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Philosopher's Quest.....(Solution + map)
Rick Hanson.....(Solution)
Thrust.....(Maps)
Last Ninja.....(Solution + maps)
Hoverbod.....(Passwords + cheats)
Frak!.....(Helpsheet)
Thunderstruck 2.....(Solution + map)
Kourtyard.....(Helpsheet + map)
Dunjunz.....(Helpsheet + 25 maps)
Gisburnes Castle.....(Solution + map)
Palace of Magic.....(Solution + map)
Impact.....(Helpsheets + passwords)
Icarus.....(Helpsheet + maps)
Sphinx Adventure.....(Solution + map)
Anarchy Zone.....(Helpsheet + passwords)
Repton 2.....(Helpsheet + 18 maps)
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The Fourth Dimension

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All versions work with keyboard or joysticks.
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"Holed Out is great.....The game plays very well and the graphics are superb."
Popular Computing Weekly, March 1989
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A & B Computing Game of the Month, June '89

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Program	Page	BBC B	B+/128	Master 128	Master Compact	Electron	Arc	6502SP/ Turbo	ADFS	Econet	Shadow RAM	Monthly Disc
Eight Bits	25											
Listing 1 (1)		■	■	■	■	■		■	■	■	■	■
Listing 2 (1)		■	■	■	■		■	■	■	■	■	■
Listing 3		■	■	■	■	■	■	■	■		■	■
Listing 4 (2)		■	■	■	■	■		■	■	■	■	■
Listings 5 (3)		■	■	■	■			■	■	■	■	■
Listing 6		■	■	■	■	■		■	■	■	■	■
Risc Revue	30											
Listing 1-2							■		■	■	■	■
Listings 3		■	■	■	■	■	■	■	■	■	■	■
FotoFiler	72											
Listing 1-2		■	■	■	■		■	■	■	■	■	■
Calendar	74											
Listings 1		■	■	■	■	■	■	■	■	■	■	■
File Conversions	82											
Listing 1		■	■	■	■	■	■	■	■	■	■	■
Triangles	71											
Listings 1-2							■	■	■	■		

Note
(1) requires Wordwise Plus (2) requires View (3) requires NetFS

EIGHT BITS

Listing 1

```
REM Canyon
REM by Andrew Hayward
REM for BBC B/B+/M/C/E & WW+
REM (c) BAU February 1990

CLS
PROCsetup
REPEAT
PROCscroll
PROCplayer
PROCcanyon
UNTIL F%=TRUE
VDU10,10,10,13
IF M%=1 THEN PRINT "Hard Luck, you crashed."
IF M%=2 THEN PRINT "Congratulations, you made it to the end of the canyon."
PRINT "Your score was "+STR$(S%)+"."
TIME=0
REPEAT
UNTIL TIME>200
PRINT "Press any key to return to menu."
J%=GET
END

.player
A%=129
X%=10
Y%=0
PROCosbyte
IF X%=90 THEN P%=P%-1
IF X%=88 THEN P%=P%+1
*FX15
VDU 31,P%,15
A%=135
X%=0
Y%=0
PROCosbyte
IF X%<>32 THEN F%=TRUE
PRINT"V"
ENDPROC

.canyon
A%=2
PROCrandom
IF A%=0 THEN L%=L%-1
IF A%=1 THEN L%=L%+1
IF L%<1 THEN L%=1
IF L%+R%+4>39 THEN L%=39-4-R%
VDU 31,L%,24,42,42
VDU 31,L%+R%,24,42,42
ENDPROC

.scroll
S%=S%+1
IF S% MOD 50=0 THEN R%=R%-1
IF R%=2 AND S% MOD 50=8 THEN M%=2
IF M%=2 THEN F%=TRUE
VDU31,0,24,10
ENDPROC

.osbyte
CALL &900
A%=?&9FD
X%=?&9FE
Y%=?&9FF
ENDPROC

.setup
VDU23;8202;0;0;0;0;
*LOAD mcode 900
A%=0
F%=FALSE
M%=1
R%=10
S%=0
X%=0
Y%=0
L%=(35-R%)/2
P%=L%+(R%/2)
DOTHIS
A%=A%+1
VDU31,L%-(10-A%),14+A%
PRINT"**";
VDU31,L%+R%+(10-A%),14+A%
PRINT"**";
TIMES 10
ENDPROC

.random
Z%=Z% MOD 4096
Z%=Z%*13+(Z% AND 64) EOR 17
IF (Z% MOD 10)<5 THEN A%=1
IF (Z% MOD 10)>4 THEN A%=0
ENDPROC
```

Listing 1a

```
 10 REM CANYON machine code
 20 REM by Andrew Hayward
 30 REM for BBC B/B+/M/C/E
 40 REM (c) BAU Feb 1990
 50 :
 60 P%=&900
 70 [
 80 JSR &FFF4
 90 STA &9FD
100 STX &9FE
110 STY &9FF
120 RTS
130 ]
140 *SAVE MCODE 900 910
```

Listing 2

```
REM WPPL Adventure game
REM by Andrew Hayward
REM for B/B+/M/C & WW+
REM (c) BAU February 1990

CLS
PROCinit
PROCwelcome
PROCprintroom
REPEAT
PROCinput
PROCdecode
UNTIL Q%=TRUE
PRINT "Press <SPACE> to end"
REPEAT
UNTIL GET=32
SELECT SEG. 0
END

.input
REPEAT
PRINT ":";
I$=GLK$
UNTIL I$<>""
I$=I$+CHR$32+CHR$32
PRINT
ENDPROC

.decode
SELECT SEGMENT 9
DELETE TEXT
TYPE I$
```

Continued ▶

EIGHT BITS

◀ Continued

```
  CURSOR TOP
  A$=""
  REPEAT
  J$=GCT$
  IF J$<>CHR$32 AND J$<>CHR$13
THEN A$=A$+J$
  UNTIL J$=CHR$32 OR J$=CHR$13
  B$=""
  REPEAT
  J$=GCT$
  IF J$<>CHR$32 AND J$<>CHR$13
THEN B$=B$+J$
  UNTIL J$=CHR$32 OR J$=CHR$13
  M$="Pardon?"
  IF A$="QUIT" OR A$="Q" THEN
PROCquit
  IF A$="N" OR A$="NORTH" THEN
PROCnorth
  IF A$="E" OR A$="EAST" THEN
PROCeast
  IF A$="S" OR A$="SOUTH" THEN
PROCsouth
  IF A$="W" OR A$="WEST" THEN
PROCwest
  IF A$="LOOK" THEN PROClook
  IF A$="GET" OR A$="TAKE" OR
A$="BUY" THEN PROCget
  IF A$="INV" THEN PROCinv
  IF A$="DROP" THEN PROCdrop
  IF A$="USE" THEN PROCuse
  IF A$="HELP" THEN PROChelp
  PRINT M$
  ENDPROC

  .use
  IF B$<>"SCREWDRIVER" AND
B$<>"PAPERCLIP" AND B$<>"PLUG"
AND B$<>"CROWBAR" AND
B$<>"MONEY" THEN M$="Use
what?"
  SELECT SEG. 1
  FIND ".objects"
  FIND B$
  CURSOR UP 2
  J$=GLT$
  IF VAL(J$)<>Ø THEN M$="You
have not got the "+B$
  IF VAL(J$)<>Ø THEN ENDPROC
  IF B$="CROWBAR" AND R%<>6
THEN M$="You can not use it
here."
  IF B$="CROWBAR" AND R%=6
THEN M$="You force open the
front door."
  IF B$="CROWBAR" AND R%=6
THEN S$=STR$(1)
  IF B$="MONEY" AND R%<>8 THEN
M$="You can not use it here."
  IF B$="MONEY" AND R%=8 THEN
M$="Take what you want to
buy."
  IF B$="PAPERCLIP" AND R%<>6
THEN M$="You bend the
paperclip into strange
shapes."
  IF B$="PAPERCLIP" AND R%=6
THEN M$="You pick the lock
using the paperclip."
  IF B$="PAPERCLIP" AND R%=6
THEN S$=STR$(1)
  IF B$="PLUG" AND R%<>5 THEN
M$="You cannot use it here."
  IF B$="PLUG" AND R%=5 THEN
PROCscrewdriver
  IF B$="SCREWDRIVER" AND
R%<>5 THEN M$="You cannot use
it here."
  IF B$="SCREWDRIVER" AND R%=5
THEN PROCscrewdriver
  ENDPROC

  .screwdriver
  CURSOR TOP
  FIND "SCREWDRIVER"
  CURSOR UP 2
  IF VAL(GCT$)<>Ø THEN M$="You
do not have the SCREWDRIVER."
  CURSOR LEFT
  IF VAL(GCT$)<>Ø THEN ENDPROC
  FIND "PLUG"
  CURSOR UP 2
  IF VAL(GCT$)<>Ø THEN M$="You
do not have the PLUG."
  CURSOR LEFT
  IF VAL(GCT$)<>Ø THEN ENDPROC
  PRINT "You use the
screwdriver to attach the
plug to your Beeb.  You then
settle downto do the typing
which you need to do."
  PRINT "Congratulations, you
have finished this truly
amazing game!"
  M$=""
  Q%=TRUE
  ENDPROC

  .drop
  M$=""
  SELECT SEG. 1
  IF B$<>"SCREWDRIVER" AND
B$<>"PAPERCLIP" AND B$<>"PLUG"
AND B$<>"CROWBAR" AND
B$<>"MONEY" THEN M$="You have
not got the "+B$+"."
  IF B$<>"SCREWDRIVER" AND
B$<>"PAPERCLIP" AND B$<>"PLUG"
AND B$<>"CROWBAR" AND
B$<>"MONEY" THEN ENDPROC
  FIND ".objects"
  FIND B$
  CURSOR UP 2
  IF VAL(GCT$)<>Ø THEN M$="You
are not holding the "+B$+"."
  CURSOR LEFT
  IF VAL(GCT$)<>Ø THEN ENDPROC
  FIND B$
  CURSOR UP 2
  DELETE WORD
  TYPE ":"+STR$(R%)
  ENDPROC

  .inv
  M$=""
  SELECT SEG. 1
  PRINT "You are holding:"
  FIND ".objects"
  Z%=FALSE
  DOTHIS
  FIND ":"
  CURSOR RIGHT
  IF VAL(GCT$)=Ø THEN
PROCprintobject
  TIMES O%
  IF Z%=FALSE THEN PRINT "
Nothing."
  ENDPROC

  .get
  M$=""
  IF B$="" THEN M$="Get what?"
  IF B$="" THEN ENDPROC
  IF B$<>"SCREWDRIVER" AND
B$<>"PAPERCLIP" AND B$<>"PLUG"
AND B$<>"CROWBAR" AND
B$<>"MONEY" THEN M$="You
cannot see a "+B$+" here."

  IF B$<>"SCREWDRIVER" AND
B$<>"PAPERCLIP" AND B$<>"PLUG"
AND B$<>"CROWBAR" AND
B$<>"MONEY" THEN ENDPROC
  SELECT SEG. 1
  CURSOR TOP
  FIND ".objects"
  FIND B$
  CURSOR UP 2
  O$=GLT$
  IF VAL(O$)<>R% THEN M$="You
cannot see a "+B$+" here."
  IF VAL(O$)<>R% THEN ENDPROC
  Z%=TRUE
  IF (R%=8 AND B$="PLUG") OR
(R%=8 AND B$="CROWBAR") THEN
PROCmoney
  IF Z%=FALSE THEN ENDPROC
  CURSOR UP 2
  FIND B$
  CURSOR UP 2
  DELETE WORD
  TYPE ":Ø"
  ENDPROC

  .money
  CURSOR TOP
  FIND "MONEY"
  CURSOR UP 2
  IF VAL(GCT$)<>Ø THEN PRINT
"You have no money."
  CURSOR LEFT
  IF VAL(GCT$)<>Ø THEN
Z%=FALSE
  CURSOR LEFT
  IF VAL(GCT$)<>Ø THEN ENDPROC
  PRINT "You pay for the
"+B$+" with the money."
  CURSOR LEFT
  DELETE WORD
  TYPE ":99"
  CURSOR TOP
  FIND ".objects"
  FIND B$
  CURSOR UP
  CURSOR LEFT
  ENDPROC

  .look
  M$=""
  PROCprintroom
  ENDPROC

  .quit
  Q%=TRUE
  M$="Good-bye."
  ENDPROC

  .north
  IF VAL(N$)=Ø THEN M$="You
bump you nose on the wall."
  IF VAL(N$)=Ø THEN ENDPROC
  IF R%=1 THEN PRINT "The
front door slams behind you,
    locking you out."
  M$=""
  R%=VAL(N$)
  PROCprintroom
  ENDPROC

  .east
  IF VAL(E$)=Ø THEN M$="You
bump you nose on the wall."
  IF VAL(E$)=Ø THEN ENDPROC
  M$=""
  R%=VAL(E$)
  PROCprintroom
  ENDPROC

  .south
  IF VAL(S$)=Ø THEN M$="You
bump your nose on the wall."
  IF VAL(S$)=Ø AND R%=6 THEN
M$="You bump your nose on the
front door."
  IF VAL(S$)=Ø THEN ENDPROC
  M$=""
  R%=VAL(S$)
  PROCprintroom
  ENDPROC

  .west
  IF VAL(W$)=Ø THEN M$="You
bump you nose on the wall."
  IF VAL(W$)=Ø THEN ENDPROC
  M$=""
  R%=VAL(W$)
  PROCprintroom
  ENDPROC

  .update
  SELECT SEGMENT 1
  CURSOR TOP
  FIND ".rooms"
  DOTHIS
  FIND "/"
  CURSOR RIGHT
  TIMES R%
  D$=GLT$
  N$=""
  FIND "N"
  CURSOR RIGHT
  REPEAT
  J$=GCT$
  IF J$>="Ø" AND J$<="9" THEN
N$=N$+J$
  UNTIL J$<"Ø" OR J$>"9"
  E$=""
  FIND "E"
  CURSOR RIGHT
  REPEAT
  J$=GCT$
  IF J$>="Ø" AND J$<="9" THEN
E$=E$+J$
  UNTIL J$<"Ø" OR J$>"9"
  S$=""
  FIND "S"
  CURSOR RIGHT
  REPEAT
  J$=GCT$
  IF J$>="Ø" AND J$<="9" THEN
S$=S$+J$
  UNTIL J$<"Ø" OR J$>"9"
  W$=""
  FIND "W"
  CURSOR RIGHT
  REPEAT
  J$=GCT$
  IF J$>="Ø" AND J$<="9" THEN
W$=W$+J$
  UNTIL J$<"Ø" OR J$>"9"
  ENDPROC

  .printroom
  PROCupdate
  PRINT D$
  PRINT "You can see :"
  FIND ".objects"
  Z%=FALSE
  DOTHIS
  FIND ":"
  CURSOR RIGHT
  O$=GLT$
  IF VAL(O$)=R%
THENPROCprintobject
  TIMES O%
  IF Z%=FALSE THEN PRINT "
Nothing."
  ENDPROC

  .printobject
  FIND "/"
  CURSOR RIGHT
```

Continued ▶

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```
  W$=GCT$
  IF W$="S" THEN PRINT " some
";
  IF W$="A" THEN PRINT "    a
";
  FIND "/"
  CURSOR RIGHT
  PRINT GLT$
  Z%=TRUE
  ENDPROC

  .init
  R%=1
  O%=5
  Q%=FALSE
  ENDPROC

  .welcome
  PRINT"Welcome to this
adventure which has"
  PRINT"been written in WPPL
with much sweat"
  PRINT"and toil as WPPL is
not an easy"
  PRINT"programming langauge
to program in."
  PRINT"Work out what you have
to do yourself."
  PRINT"Or type HELP if your
are stuck."
  PRINT
  ENDPROC

  .help
  PRINT"This adventure was
written purely to   show the
variety of programs that can
bewritten in WPPL.  The aim of
the        adventure is to
attach
  a PLUG to your   Beeb so
that you can use it."
  PRINT"The verbs that the
computer understand  are:"
  PRINT"N / E / W / S      -
Directions"
  PRINT"TAKE / GET / BUY - To
pick up an object"
  PRINT"DROP             - To
drop an object"
  PRINT"USE              - To
use an object"
  PRINT"INV              -
Inventory"
  PRINT"QUIT             -
Last resort!"
  PRINT"LOOK             - To
redisplay the
      description."
  M$=""
  ENDPROC
```

Listing 2a

```
 REM segment 1

 .rooms
 /You are in the hallway of
your house.  Exits lead
north, south, east and west.
 :N6:E3:S2:W5

 /You are in a lounge.  The
only exit is  back the way you
came.
 :N1:E0:S0:W0

 /You are in tiny, ugly
kitchen which you try to avoid
as much as possible.  The
only exits are west and south.
 :N0:E0:S4:W1

 /You are in the larder.
This is a       dead-end.
 :N3:E0:S0:W0

 /You are standing in the
study.  There isa Beeb here
although it has no plug.
You realise that you have some
typing todo.
 :N0:E1:S0:W0

 /You are standing at the
west-end of a   small street.
There are exits in all
directions.
 :N10:E7:S0:W11

 /You are standing at the
east-end of a   small street.
There are exits in all
directions.
 :N9:E10:S8:W6

 /You are standing in a small
hardware     shop.
 :N7:E0:S0:W0

 /You are lost in a maze of
backstreets.  Exits lead in
all directons and you are
totally confused.
 :N9:E10:S11:W9

 /You are lost in a maze of
backstreets.  Exits lead in
all directons and you are
totally confused.
 :N10:E6:S9:W10

 /You are lost in a maze of
backstreets.  Exits lead in
all directons and you are
totally confused.
 :N7:E9:S10:W11

 .objects

 :2
 /A
 /SCREWDRIVER

 :4
 /A
 /PAPERCLIP

 :8
 /A
 /PLUG

 :8
 /A
 /CROWBAR

 :10
 /S
 /MONEY
```

Listing 3

```
  10 REM List Vector Values
  20 REM by J O'Broin
  30 REM and Bill Hine
  40 REM for B/B+/E/M/C
  50 REM (c) BAU Feb 1990
 102 xvtab  = &B0
 104 xvptr  = &B2
 182 JSR test_vec
 184 BCS more
 220 :
 282 JSR extvecs
 302 JSR &FFE7
 322 INX
 350 :
 471 LDX #0
 472 LDA #&A8
 473 LDY #&FF
 474 JSR &FFF4
 475 STX xvtab
 476 STY xvtab+1
 492 STA xvptr
 494 TAX
1470 :
1480 .test_vec
1490 LDY #0
1500 LDA (zp),Y
1510 LDY lokptr
1520 CMP (lookup),Y
1530 BNE vec_changed
1540 INY
1550 LDA (lookup),Y
1560 LDY #1
1570 CMP (zp),Y
1580 BNE vec_changed
1590 LDY xvptr
1600 INY
1610 INY
1620 LDA (xvtab),Y
1630 BNE vec_changed
1640 INC zp
1650 INC zp
1660 INC lokptr
1670 INC lokptr
1680 INC xvptr
1690 INC xvptr
1700 INC xvptr
1710 SEC
1720 RTS
1730 .vec_changed
1740 CLC
1750 RTS
1760 .extvecs
1770 LDY xvptr
1780 INY
1790 INY
1800 LDA (xvtab),Y
1810 BEQ extvecs_exit
1820 LDA #ASC" "
1830 JSR &FFEE
1840 JSR &FFEE
1850 LDA #135
1860 JSR &FFEE
1870 LDA #&0D
1880 JSR hex
1890 LDA #&9F
1900 CLC
1910 ADC xvptr
1920 JSR hex
1930 DEC zp
1940 LDY #0
1950 LDA (zp),Y
1960 DEC zp
1970 CMP #&FF
1980 BNE xv_inactive
1990 LDA (zp),Y
2000 CMP xvptr
2010 BEQ xv_active
2020 .xv_inactive
2030 LDA #ASC" "
2040 JSR &FFEE
2050 LDA #129
2060 JSR &FFEE
2070 JMP pri_xvec
2080 .xv_active
2090 LDA #130
2100 JSR &FFEE
2110 LDA #ASC"*"
2120 JSR &FFEE
2130 .pri_xvec
2140 LDY xvptr
2150 LDA (xvtab),Y
2160 PHA
2170 INY
2180 LDA (xvtab),Y
2190 PHA
2200 INY
2210 LDA (xvtab),Y
2220 JSR hex
2230 LDA #ASC" "
2240 JSR &FFEE
2250 PLA
2260 JSR hex
2270 PLA
2280 JSR hex
2290 INC zp
2300 INC zp
2310 .extvecs_exit
2320 INC xvptr
2330 INC xvptr
2340 INC xvptr
2350 RTS
2360 ]NEXT
2370 OSCLI "SAVE VecList 900
"+STR$~P%
```

Listing 4

```
  10 REM Viewpage Utility
  20 REM by Andrew Pillidge
  30 REM for B/B+/E/M/C with
View
  40 REM (c) BAU Feb 1990
  50 :
  60 pt=&90
  70 x=&92:y=&94
  80 ruler=&5CF
  90 accum=&96
 100 leftmargin=&97
 110 pagelength=&98
 120 pagelen2=&99
 130 blanks=&9A
 140 oswrch=&FFEE
 150 osrdch=&FFE0
 160 FOR pass=0 TO 3 STEP 3
 170 P%=&900
 180 [OPT pass
 190 .temp
 200 LDA #0
 210 STA x
 220 STA x+1
 230 STA leftmargin
 240 STA pagelen2
 250 STA pt
 260 TAX
 270 LDA #66
 280 STA pagelength
 290 JSR resetY
 300 LDA &18
 310 STA pt+1
 320 INC pt+1
 330 LDA #4
 340 LDY #3
 350 .margins
 360 STA blanks,Y
 370 DEY
 380 BPL margins
 390 :
 400 .lp
 410 JSR incpt
 420 LDY #0
 430 LDA (pt),Y
 440 BNE notend
 450 LDA #31
 460 JSR oswrch
 470 LDA #0
 480 JSR oswrch
 490 LDA #30
 500 JSR oswrch
 510 RTS
 520 :
```

Continued ▶

EIGHT BITS

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```
530 .notend
540 CMP #128
550 BNE aa
560 JSR embcom
570 JMP lp
580 .aa
590 CMP #129
600 BNE bb
610 LDX #3
620 .rshift
630 JSR incpt
640 DEX
650 BNE rshift
660 STA tab+5
670 STA rulercount+3
680 LDA pt
690 STA tab+4
700 STA rulercount+2
710 JSR endline
720 JMP lp
730 .bb
740 CMP #9
750 BNE hh
760 LDA #42
770 BNE cc
780 .hh
790 CMP #11
800 BNE gg
810 LDA #62
820 .cc
830 STA temp
840 JSR tab
850 BEQ lp
860 .gg
870 CMP #32
880 BEQ dd
890 CMP #26
900 BNE ee
910 .dd
920 JSR incX
930 JMP lp
940 .ee
950 CMP #13
960 BNE ff
970 JSR incY
980 CLC
990 LDY #3
1000 LDA pagelen2
1010 .bloop
1020 ADC blanks,Y
1030 DEY
1040 BPL bloop
1050 CMP pagelength
1060 BMI endloop
1070 JSR osrdch
1080 JSR resetY
1090 JMP lp
1100 .ff
1110 CMP #32
1120 BMI endloop
1130 CMP #127
1140 BPL endloop
1150 :
1160 JSR incX
1170 LDA #25:JSR oswrch
1180 LDA #69:JSR oswrch
1190 LDA x:JSR oswrch
1200 LDA x+1:JSR oswrch
1210 LDA y:JSR oswrch
1220 LDA y+1:JSR oswrch
1230 .endloop
1240 JMP lp
1250 :
1260 .tab
1270 JSRincX
1280 LDA ruler,X
1290 CMP temp
1300 BNE tab
1310 RTS
1320 :
1330 .incX
1340 CLC
1350 LDA x
1360 ADC #4
1370 STA x
1380 LDA x+1
1390 ADC #0
1400 STA x+1
1410 INX
1420 RTS
1430 :
1440 .incY
1450 SEC
1460 LDA y
1470 SBC #8
1480 STA y
1490 LDA y+1
1500 SBC #0
1510 STA y+1
1520 INC pagelen2
1530 .cr
1540 LDA #0
1550 STA x
1560 STA x+1
1570 LDY leftmargin
1580 INY
1590 .lmloop
1600 JSR incX
1610 DEY
1620 BNE lmloop
1630 LDX #0
1640 RTS
1650 :
1660 .resetY
1670 LDA #12:JSR oswrch
1680 LDA #248
1690 STA y
1700 LDA #3
1710 STA y+1
1720 LDA #0
1730 STA pagelen2
1740 RTS
1750 :
1760 .incpt
1770 CLC
1780 LDA pt
1790 ADC #1
1800 STA pt
1810 LDA pt+1
1820 ADC #0
1830 STA pt+1
1840 RTS
1850 :
1860 .embcom
1870 JSR incpt
1880 LDA (pt),Y
1890 STA temp
1900 JSR incpt
1910 LDA (pt),Y
1920 ASL A
1930 ASL A
1940 ASL A
1950 SEC
1960 SBC temp
1970 CMP #4
1980 BNE notLJ
1990 RTS
2000 :
2010 .notLJ
2020 CMP #229
2030 BNE notCE
2040 STA temp
2050 BEQ rj
2060 :
2070 .notCE
2080 CMP #254
2090 BNE notRJ
2100 :
2110 .rj
2120 LDA #0
2130 STA temp+1
2140 .rulercount
2150 INX
2160 LDA ruler,X
2170 CMP #62
2180 BNE notmargin
2190 STX temp+1
2200 .notmargin
2210 CMP #13
2220 BNE rulercount
2230 LDY #0
2240 .tx
2250 INY
2260 DEX
2270 LDA (pt),Y
2280 CMP #13
2290 BNE tx
2300 TXA
2310 LDY temp
2320 CPY #229
2330 BNE nce
2340 CLC
2350 ADC temp+1
2360 LSR A
2370 .nce
2380 TAY:LDX #0
2390 .tx2
2400 JSR incX
2410 DEY
2420 BPL tx2
2430 RTS
2440 :
2450 .notRJ
2460 CMP #28
2470 BNE notLM
2480 JSR calculate
2490 STA leftmargin
2500 JSR cr
2510 JMP endline
2520 :
2530 .notLM
2540 CMP #16
2550 BNE notPL
2560 JSR calculate
2570 SEC
2580 SBC #2
2590 STA pagelength
2600 JMP endline
2610 :
2620 .notPL
2630 LDX #0
2640 CMP #32
2650 BEQ yes
2660 INX
2670 CMP #34
2680 BEQ yes
2690 INX
2700 CMP #20
2710 BEQ yes
2720 INX
2730 CMP #38
2740 BNE endline
2750 :
2760 .yes
2770 JSR calculate
2780 STA blanks,X
2790 :
2800 .endline
2810 LDY #0
2820 .rpt
2830 JSR incpt
2840 LDA (pt),Y
2850 CMP #13
2860 BNE rpt
2870 RTS
2880 :
2890 .calculate
2900 LDA #0
2910 STA accum
2920 .chr
2930 INY
2940 LDA (pt),Y
2950 CMP #13
2960 BEQ done
2970 SEC
2980 SBC #48
2990 BMI chr
3000 CLC
3010 STA temp
3020 LDA accum
3030 ASL A
3040 ASL A
3050 ASL A
3060 STA temp+1
3070 LDA accum
3080 ASL A
3090 ADC temp+1
3100 ADC temp
3110 STA accum
3120 JMP chr
3130 .done
3140 LDA accum
3150 RTS
3160 :
3170 ]
3180 NEXT pass
3190 PRINT"Press a key to save PREVIEW"
3200 IF GET
3210 *SAVE PREVIEW 0900 0AFF
```

Listing 5

```
10 REM Change Password
20 REM by Jason O'Broin
30 REM for B/B+/M/C + Net
40 REM (c) BAU Feb 1990
50 :
60 IF PAGE>=&1200 GOTO 80
70 PRINT "Rerun with PAGE>=&1200":END
80 osrdch=&FFE0
90 osasci=&FFE3
100 osnewl=&FFE7
110 oswrch=&FFEE
120 oscli=&FFF7
130 keepit=&F8
140 FOR pass=0 TO 3 STEP 3
150 P%=&E23
160 [OPT pass
170 LDX #0
180 .loop
190 LDA f1,X
200 JSR oswrch
210 INX
220 CMP #ASC":"
230 BNE loop
240 LDX #0
250 .loop1
260 JSR osrdch
270 CMP #13
280 BEQ over
290 STA f2,X
300 INX
310 JMP loop1
320 .over
330 TXA
340 TAY
350 JSR osnewl
360 LDX #0
370 .loop3
380 LDA f3,X
390 JSR oswrch
400 INX
410 CMP #ASC":"
420 BNE loop3
430 LDA #32
440 STA f2,Y
450 INY
460 STY keepit
```

Continued ▶

◀ Continued

```
470 .loop4
480 JSR osrdch
490 CMP #13
500 BEQ out
510 STA f2,Y
520 INY
530 JMP loop4
540 .out
550 LDA #13
560 STA f2,Y
570 INY
580 JSR osnewl
590 LDX #0
600 .loop5
610 LDA f4,X
620 JSR oswrch
630 INX
640 CMP #ASC":"
650 BNE loop5
660 LDX keepit
670 .loop7
680 JSR osrdch
690 CMP f2,X
700 BNE error
710 CMP #13
720 BEQ finish
730 INX
740 JMP loop7
750 .finish
760 LDX #iam MOD 256
770 LDY #iam DIV 256
780 JSR oscli
790 LDX #0
800 .loop8
810 LDA #32
820 STA f2,X
830 INX
840 CPX #25
850 BNE loop8
860 RTS
870 .error
880 LDX #0
890 .loop6
900 LDA f5,X
910 JSR osasci
920 INX
930 CMP #13
940 BNE loop6
950 RTS
960 .f1 EQUS"Old Password :"
970 .f3 EQUS"New Password :"
980 .f4 EQUS"Re-enter      :"
990 .f5 EQUS"Passwords don't agree"
1000 EQUB 7
1010 EQUB 13
1020 .iam EQUS "PASS "
1030 .f2
1040 ]NEXT
1050 OSCLI "SAVE CP E23 "+STR$~(P%)
```

Listing 6

```
10 REM *ALLDIRS <command>
20 REM by Joe Abley
30 REM for B/B+/E/M/C
40 REM (c) BAU Feb 1990
120 :
130 osargs = &FFDA
140 osgbpb = &FFD1
150 osfile = &FFDD
160 oswrch = &FFEE
170 osnewl = &FFE7
180 osbyte = &FFF4
190 osasci = &FFE3
200 oscli  = &FFF7
210 :
220 zp=&70
230 comm=&700
240 :
250 limit=&40
260 :
270 FOR pass=0 TO 3 STEP 3
280 P%=&900
290 [OPT pass
300 :
310 .alldirs
320 LDY #0
330 LDA #1
340 LDX #zp
350 JSR osargs
360 LDY #0
370 .copycom
380 LDA (zp),Y
390 STA comm,Y
400 INY
410 CMP #13
420 BNE copycom
430 :
440 LDA &202
450 STA olderr
460 LDA &203
470 STA olderr+1
480 LDA #newbrk MOD &100
490 STA &202
500 LDA #newbrk DIV &100
510 STA &203
520 :
530 JSR searchdir
540 :
550 LDA olderr
560 STA &202
570 LDA olderr+1
580 STA &203
590 :
600 LDA &FF
610 ROL A
620 BCS escaped
630 RTS
640 :
650 .escaped
660 LDA #ASC"^"
670 STA data
680 LDA #13
690 STA data+1
700 .return
710 LDA levels
720 BNE dirup
730 LDA #126
740 JSR osbyte
750 BRK
760 EQUB 17
770 EQUS "Escape"
780 BRK
790 :
800 .dirup
810 LDX #dir MOD &100
820 LDY #dir DIV &100
830 JSR oscli
840 DEC levels
850 JMP return
860 :
870 .searchdir
880 LDA #ASC"="
890 JSR oswrch
900 LDA #ASC">"
910 JSR oswrch
920 LDA #32
930 JSR oswrch
940 LDX #0
950 .showpath
960 LDA path,X
970 JSR osasci
980 INX
990 CMP #13
1000 BNE showpath
1010 :
1020 TSX
1030 STX stack
1040 LDX #comm MOD &100
1050 LDY #comm DIV &100
1060 JSR oscli
1070 .return_after_error
1080 :
1090 LDA #0
1100 STA file
1110 .repeat
1120 LDX #12
1130 .copy
1140 LDA oldblk,X
1150 STA newblk,X
1160 DEX
1170 BPL copy
1180 :
1190 LDA &FF
1200 ROL A
1210 BCC noesc
1220 RTS
1230 .noesc
1240 :
1250 LDX #newblk MOD &100
1260 LDY #newblk DIV &100
1270 LDA #8
1280 JSR osgbpb
1290 :
1300 LDA newblk+9
1310 STA file
1320 LDA newblk+5
1330 BEQ notlast
1340 RTS
1350 :
1360 .notlast
1370 LDX data
1380 LDA #13
1390 STA data+1,X
1400 LDA #32
1410 STA data
1420 :
1430 LDX #fileblk MOD &100
1440 LDY #fileblk DIV &100
1450 LDA #5
1460 JSR osfile
1470 :
1480 CMP #2
1490 BNE repeat
1500 :
1510 LDX #dir MOD &100
1520 LDY #dir DIV &100
1530 JSR oscli
1540 INC levels
1550 :
1560 LDX #0
1570 .findend
1580 LDA path,X
1590 INX
1600 CMP #13
1610 BNE findend
1620 DEX
1630 TXA
1640 PHA
1650 CPX #limit
1660 BCC notover1
1670 LDA path-1,X
1680 CMP #46
1690 BEQ leavealone
1700 .notover1
1710 LDA #ASC"."
1720 STA path,X
1730 INX
1740 CPX #limit
1750 BCC notoverlimit
1760 STA path+1,X
1770 STA path+2,X
1780 INX
1790 INX
1800 INX
1810 JMP endofname
1820 .notoverlimit
1830 LDY #0
1840 .copynewname
1850 LDA data+1,Y
1860 CMP #32
1870 BEQ endofname
1880 STA path,X
1890 INY
1900 INX
1910 CMP #13
1920 BNE copynewname
1930 .endofname
1940 LDA #13
1950 STA path,X
1960 :
1970 .leavealone
1980 LDA file
1990 PHA
2000 JSR searchdir
2010 PLA
2020 STA file
2030 PLA
2040 TAX
2050 LDA #13
2060 STA path,X
2070 :
2080 LDA &FF
2090 ROL A
2100 BCC noesc2
2110 RTS
2120 .noesc2
2130 DEC levels
2140 :
2150 LDA #ASC"^":STA data
2160 LDA #13:STA data+1
2170 :
2180 LDX #dir MOD &100
2190 LDY #dir DIV &100
2200 JSR oscli
2210 JMP repeat
2220 :
2230 :
2240 .newbrk
2250 LDX stack
2260 TXS
2270 LDX #0
2280 .disp
2290 LDA text,X
2300 JSR oswrch
2310 INX
2320 CMP #32
2330 BNE disp
2340 LDY #1
2350 .err
2360 LDA (&FD),Y
2370 JSR oswrch
2380 INY
2390 CMP #0
2400 BNE err
2410 JSR osnewl
2420 JMP return_after_error
2430 :
2440 :
2450 .olderr
2460 EQUW 0
2470 :
2480 .text
2490 EQUS "Error: "
2500 :
2510 .newblk
2520 EQUB 0
2530 EQUD 0
2540 EQUD 0
2550 EQUD 0
2560 :
2570 .oldblk
2580 EQUB 0
2590 EQUD data
2600 EQUD 1
2610 .file
2620 EQUD 0
2630 :
```

Continued ▶

EIGHT BITS

◀ **Continued**

```
2640 .fileblk
2650 EQUW data+1
2660 EQUD 0
2670 EQUD 0
2680 EQUD 0
2690 EQUD 0
2700 :
2710 .stack
2720 EQUB 0
2730 :
2740 .levels
2750 EQUB 0
2760 :
2770 .dir
2780 EQUS "DIR "
2790 :
2800 .data
2810 EQUD 0
2820 EQUD 0
2830 EQUD 0
2840 :
2850 .path
2860 EQUS "@":EQUB 13
2870 ]NEXT
2900 :
2910 DIM X% &100
2920 Y%=X% DIV &100
2930 $X%="SAVE ALLDIRS 900 "+STR$~P%+" FFFF0900 FFFF0900"
2940 CALL &FFF7
```

RISC REVUE

Listing 1

```
10 REM >Demon (RR1)
20 REM Cellular automaton
30 REM by J E Connett
40 REM for Archimedes only
50 REM (c) BAU Feb 1990
60 :
70 MODE 13
80 DIM code 200
90 DIM inblock% 20,outblock% 20
100 !inblock%=148
110 inblock%!4=150
120 inblock%!8=-1
130 SYS "OS_ReadVduVariables",inblock%,outblock%
140 IF outblock%!4<&28000 PRINT"Program requires 160K of screen memory":END
150 ON ERROR IF FNerror THEN CLS:END
160 CLS
170 REPEAT
180 INPUT"Number of colours (best 8-15):"N%
190 UNTIL N%>=2 AND N%<=20
200 REPEAT
210 INPUT "Colour number offset (positive):"O%
220 UNTIL O%>0
230 G%=N%-1
240 sc1%=!outblock%
250 sc2%=sc1%+&14000
260 PROCassemble
270 OFF
280 *FX 112,2
290 PROCtext
300 *FX 112,1
310 PROCtext
320 FOR I%=0 TO 255
330 FOR J%=0 TO 255
340 K%=I%*320+J%
350 sc1%?K%=RND(N%)+O%
360 NEXT
370 NEXT
380 E%=sc1%:F%=sc2%
390 Q%=0
400 REPEAT
410 PROCgrow
420 UNTIL FALSE
430 END
440 :
450 DEF FNerror
460 *FX 113,1
470 *FX 112,1
480 IF ERR<>17 CLS:REPORT:PRINT;" at line ";ERL:=TRUE
490 PRINT TAB(32,25)"(S)ave"
500 PRINT TAB(32,26)"(R)epeat"
510 PRINT TAB(32,27)"(E)nd"
520 REPEAT
530 R$=CHR$(GET AND &DF)
540 UNTIL R$="S" OR R$="R" OR R$="E"
550 IF R$="S" PROCsave
560 =(R$="E")
570 :
580 DEF PROCassemble
590 col=0:row=1
600 index=2:data=3
610 screen1=4:screen2=5
620 numcol=6:adj=7
630 newindex=8:result=10
640 newcol=11:newrow=12
650 sp=13:link=14:pc=15
660 FOR pass=0 TO 2 STEP 2
670 P%=code
680 [OPT pass
690 STMFD (sp)!,{link}
700 MVN row,#0
710 .rowloop
720 ADD row,row,#1
730 MVN col,#0
740 .colloop
750 ADD col,col,#1
760 MOV result,#320
770 MUL index,row,result
780 ADD index,col,index
790 LDRB data,[screen1,index]
800 ADD newcol,col,#1
810 MOV newrow,row
820 BL comp
830 BEQ out
840 SUB newcol,col,#1
850 MOV newrow,row
860 BL comp
870 BEQ out
880 MOV newcol,col
890 ADD newrow,row,#1
900 BL comp
910 BEQ out
920 MOV newcol,col
930 SUB newrow,row,#1
940 BL comp
950 BEQ out
960 STRB data,[screen2,index]
970 .out
980 CMP col,#255
990 BLT colloop
1000 CMP row,#255
1010 BLT rowloop
1020 LDMFD (sp)!,{pc}
1030 :
1040 .comp
1050 CMP newrow,#0
1060 ADDLT newrow,newrow,#256
1070 CMP newrow,#255
1080 SUBGT newrow,newrow,#256
1090 CMP newcol,#0
1100 ADDLT newcol,newcol,#256
1110 CMP newcol,#255
1120 SUBGT newcol,newcol,#256
1130 MOV result,#320
1140 MUL newindex,newrow,result
1150 ADD newindex,newcol,newindex
1160 LDRB adj,[screen1,newindex]
1170 SUB result,adj,data
1180 CMP result,#1
1190 CMNNE result,numcol
1200 STREQB adj,[screen2,index]
1210 MOV pc,link
1220 ]
1230 NEXT pass
1240 ENDPROC
1250 :
1260 DEF PROCtext
1270 CLS
1280 PRINT TAB(34,3)"DEMON"
1290 PRINT TAB(33,8)"Colours"
1300 PRINT TAB(35,10);N%
1310 PRINT TAB(33,14)"Offset"
1320 PRINT TAB(35,16);O%
1330 PRINT TAB(33,20)"Pass"
1340 PRINT TAB(33,25)"ESCAPE"
1350 PRINT TAB(33,26)"to stop"
1360 ENDPROC
1370 :
1380 DEF PROCgrow
1390 IF E%<F% THEN
1400 *FX 113,1
1410 *FX 112,1
1420 ELSE
1430 *FX 113,2
1440 *FX 112,2
1450 ENDIF
1460 PRINT TAB(35,22);Q%
1470 Q%+=1
1480 CALL code
1490 SWAP E%,F%
1500 ENDPROC
1510 :
1520 DEF PROCsave
1530 INPUTTAB(32,29)"Filename";TAB(32,30)F$
1540 OSCLI("SCREENSAVE "+F$)
1550 ENDPROC
```

Listing 2

```
10 REM >ArmRoots (RR2)
20 REM ARM square roots
30 REM by C Attenborough
40 REM for Archimedes only
50 REM (c) BAU Feb 1990
60 :
70 DIM code% 100
80 sqrt=0:square=1:mask=2
90 shift=3:diff=4:subtrahend=5
100 t=6:min=7
110 FOR pass%=0 TO 2 STEP 2
120 P%=code%
130 [OPT pass%
140 .root
150 MOV mask,#&C0000000
160 MOV shift,#30
170 MOV sqrt,#0
180 MOV min,#0
190 .nextbit
200 MOV sqrt,sqrt,LSL #1
210 MOV min,min,LSL #2
220 AND t,square,mask
230 MOV t,t,LSR shift
240 ORR min,min,t
250 MOV subtrahend,sqrt,LSL #1
260 ADD subtrahend,subtrahend,#1
270 CMP min,subtrahend
280 SUBGE min,min,subtrahend
290 ADDGE sqrt,sqrt,#1
300 MOV mask,mask,LSR #2
310 SUBS shift,shift,#2
320 BPL nextbit
330 MOV PC,R14
340 ]
350 NEXT pass%
360 :
370 REPEAT
380 REPEAT
390 INPUT "Give me a positive number: "B%
400 IF B%<0 PRINT "Positive number please!"
410 UNTIL B%>=0
420 PRINT "The integer part of the square root is ";USR root
430 PRINT
440 UNTIL FALSE
```

Listing 3

```
10 REM >Grab (RR3)
20 REM Grab system sprites
30 REM by David Acton
40 REM for Archimedes only
50 REM (c) BAU Feb 1990
60 :
70 SYS "Wimp_BaseOfSprites" TO base%
80 REPEAT
90 INPUT"Save sprites as: "f$
100 SYS "XOS_SpriteOp",12+256,base%,f$ TO ;ok%
110 UNTIL (ok% AND 1)=0
120 END
```

Listing 4

```
10 R1=400:R2=70:MODE0:VDU19,1,3,0,0;19,0,4,0;0:S=PI*(4/5):FOR A=0 TO 2*PI STEP PI/6:VDU 29,COS(A)*R1+640;SIN(A)*R1+512;18,0,3:FOR B=S TO (3.2*PI)+S STEP S:VDU 25,4,SIN(B)*R2;COS(B)*R2;25,4,SIN(B+S)*R2;COS(B+S)*R2;25,85,0,0;:NEXT B,A
```

FOTOFILER

Listing 1

```
 10 REM FOTOFILER prog1
 20 REM by Jeff Tullin
 30 REM for all Acorn micros
 40 REM (c) BAU Feb 1990
 50 :
 60 REM save as 'FOTO'
 70 :
 80 HIMEM=&3B00
 90 B$="............"
100 address=&70
110 word=&72
120 flag=&73
130 oswrch=&FFEE
140 osnwl=&FFE7
150 :
160 FOR opt=0 TO 2 STEP 2
170 P%=HIMEM
180 [OPT opt
190 LDA# ((table-10) MOD 2
56)
200 STA address
210 LDA# ((table-10) DIV 25
6)
220 STA address+1
230 LDA# 0
240 STA word
250 STA flag
260 LDX# 8
270 \ (newline every seven w
ords)
280 .loop
290 INC word
300 DEX
310 BNE skip
320 LDX# 7
330 JSR osnwl
340 LDA# 9
350 JSR oswrch
360 .skip
370 LDA# 9
380 JSR oswrch
390 \ add 9 to working addre
ss
400 CLC
410 LDA address
420 ADC# 9
430 STA address
440 BCC over
450 LDA address+1
460 ADC# 0
470 STA address+1
480 .over
490 \ Check data table for s
et bits
500 LDA word
510 AND# 7
520 BNE lessthan7
530 LDA# 8
540 .lessthan7
550 TAY:\ (Y now holds bet
ween 1-8)
560 LDA# 0
570 SEC
580 .btloop
590 ROL A
600 DEY
610 BNE btloop: \ (A rotate
d Y times)
620 PHA
630 LDA word
640 SEC
650 SBC# 1
660 LSR A
670 LSR A
680 LSR A
690 TAY: \ (Y holds word/8)
700 PLA
710 AND D%,Y
720 BEQ string
730 \ (inverse the text if b
it set)
740 LDA# 1
750 STA flag
760 LDY# 4
770 .iloop
780 LDA inverse-1,Y
790 JSR oswrch
800 DEY
810 BNE iloop
820 .string:\ (print the wor
d)
830 LDY# 9
840 .printword
850 LDA (address),Y
860 BEQ out
870 JSR oswrch
880 DEY
890 BNE printword
900 LDA# 9
910 JSR oswrch
920 \ (if flag is set, un-hi
ghlight)
930 LDA flag
940 BEQ loop
950 LDA# 0
960 STA flag
970 LDY# 4
980 .nloop
990 LDA normal-1,Y
1000 JSR oswrch
1010 DEY
1020 BNE nloop
1030 BEQ loop
1040 .out
1050 RTS
1060 :
1070 .normal
1080 EQUD &11011180
1090 .inverse
1100 EQUD &11001181
1110 :
1120 .D%
1130 EQUD 0
1140 EQUD 0
1150 EQUD 0
1160 EQUD 0
1170 :
1180 .S%
1190 EQUS"FILE    "
1200 EQUB 13
1210 .table
1220 ]
1230 NEXT
1240 :
1250 FOR X= 0 TO 97
1260 READ A$:B$=""
1270 FOR Y=9 TO 1 STEP -1
1280 B$=B$+MID$(A$,Y,1)
1290 NEXT
1300 $(P%+X*9)=B$
1310 NEXT
1320 $(P%+X*9)=STRING$(10,CH
R$(0))
1330 :
1340 CHAIN"FILER"
1350 DATA"Men      ","Women
 ","Children ",    "Babies
","O.A.P's  ","Portrait ",
"Glamour  "
1360 DATA"At home  ","Abroad
 ","Holidays ",    "Xmastime
","Weddings ","Parties  ",
"Sports   "
1370 DATA"Schools  ","Music
 ","Art      ",    "Theatre
","Events   ","Fairs    ",
"Exhibits "
1380 DATA"Seaside  ","Rivers
 ","Lakes    ",    "Hills
","Trees    ","Farms    ",
"Parks    "
1390 DATA"Cities   ","Buildin
gs","Interiors",    "Shops
","Adverts  ","Tools    ",
"Machinery"
1400 DATA"Cars     ","Bus/van
s ","2-wheels ",    "Aircraft
","Ships    ","Boats    ",
"Railways "
1410 DATA"Horsedr. ","Oth.veh
ic","Military ",    "Weaponry
","Workers  ","Crafts   ",
"Hobbies  "
1420 DATA"Animals  ","Pets
 ","'Cute'   ",    "Wildlife
","Birds    ","Insects  ",
"Fish     "
1430 DATA"Weather  ","Sunshin
e ","Sunset   ",    "Night
","Snow     ","Rain     ",
"Misty    "
1440 DATA"Drought  ","Floods
 ","Lightning",    "Clouds
","Fire     ","Plants   ",
"Flowers  "
1450 DATA"Furniture","Utensil
s ","Food     ",    "Drink
","Glass    ","Metal    ",
"Toys     "
1460 DATA"Signs    ","Amusing
 ","Abstract ",    "Reflected
","Lowlight ","Backlit  ",
"Flash    "
1470 DATA"Dbl-expo ","Softfoc
us","Wideangle",    "Long-expo
","Highspeed","Close-ups",
"Negative "
1480 DATA"PRINT    ","SLIDE
 ","COLOUR   ",    "B/WHITE
","35mm     ","110/Disc ",
"Lgeformat"
```

```
 10 REM FOTOFILER prog2
 20 REM by Jeff Tullin
 30 REM for all Acorn micros
 40 REM (c) BAU Feb 1990
 50 :
 60 REM save as 'FILER'
 70 :
 80 ON ERROR PROCerror
 90 *TV255
100 *FX4,1
110 @%=0
120 CLOSE#0
130 MODE 3
140 HIMEM=&3B00
150 VDU 19,1,7,0,0,0,0,0
160 VDU 19,0,4,0,0,0,0,0
170 PROCvariables
180 :
190 REPEAT
200 PROCmenu
210 UNTIL quit=TRUE
220 CLS:END
230 :
240 DEF PROCmenu
250 CLS
260 PROCp(14,1," PHOTO FILE
R by Jeff Tullin. (C) BBC Acor
n User 1989 ",1)
270 PROCp(35,3," MENU ",1)
280 PROCp(21,5,"1)    Add a
picture to the file",0)
290 PROCp(21,7,"2)    Delete
/amend a picture",0)
300 PROCp(21,9,"3)    Find a
picture",0)
310 PROCp(21,11,"4)    Brows
e through file",0)
320 PROCp(21,13,"5)    Creat
e new file",0)
330 PROCp(21,15,"6)    Chang
e working filename  ( """+$S%+
""" )",0)
340 PROCp(21,17,"7)    Quit"
,0)
350 :
360 :
370 VDU 7
380 PROCp(41,19,wipe$,0)
390 PROCp(26,19," Please se
lect ( 1-7 ) ",1)
400 *FX15
410 REPEAT:option$=GET$:UNT
IL option$>"0" AND option$<"8"
420 IF option$="1" PROCaddr
ecord
430 IF option$="2" PROCamen
d
440 IF option$="3" PROCfind
match
450 IF option$="4" PROCbrow
se
460 IF option$="5" PROCnewd
isc
470 IF option$="6" PROCnewn
ame
480 IF option$="7" quit=TRU
E
490 ENDPROC
500 :
510 :
520 DEF PROCaddrecord
530 REPEAT
540 CLS
550 PROCp(21,1," Adding a r
ecord to the file: "+$S%+(LEFT
$("        ",7-LEN ($S%))),1)
560 PROCp(1,3," Holder? ",1
)
570 INPUT TAB(11,3)holder%
580 IF holder%<0 GOTO 710
590 PROCp(18,3," Picture no
.? ",1)
600 INPUT TAB(33,3)picture%
610 PROCp(40,3," Title? ",1
)
620 PROCp(49,3,"..........
...........",0):REM (thats 23
 dots)
630 INPUT LINE TAB(49,3)tit
le$
640 PROCclear
650 PROCinstruct
660 PROCalter(0)
670 PROCp(26,20,wipe$,0)
680 INPUT TAB(26,20)"Save t
o disc ? "A$
690 IF LEFT$(A$,1)<>"Y"GOTO
 540
700 PROCsave(-1)
710 UNTIL holder%<0
720 ENDPROC
730 :
740 :
750 DEF PROCamend
760 CLS
770 PROCp(25,1," Amend/dele
te a record ",1)
780 PROCp(1,3," Holder no.?
 ",1)
790 INPUT TAB(18,3)A%
800 PROCp(1,5," Picture no.
? ",1)
810 INPUT TAB(18,5)B%
820 PROCp(24,9," Please wai
t - searching ",1)
830 P%=-1
840 REPEAT
```

Continued ▶

FOTOFILER

◀ **Continued**

```
 850  P%=P%+1
 860  PROCload(P%,1)
 870  suitable=FALSE
 880  IF A%=holder% AND B%=picture% suitable=TRUE
 890  UNTIL suitable OR eof
 900  PROCp(1,3,wipe$,0):PROCp(1,5,wipe$,0):PROCp(24,9,wipe$,0)
 910  IF NOT suitable INPUT TAB(20,11)" Record not found. Press RETURN "A$:ENDPROC
 920  PROCn
 930  PROCheaders
 940  PROCinstruct
 950  PROCalter(-1)
 960  PROCp(26,20,wipe$,0)
 970  PROCp(26,20,"Save to disc ",0)
 980  IF FNyes PROCsave(P%)
 990  ENDPROC
 1000 :
 1010 :
 1020  DEF PROCfindmatch
 1030  CLS
 1040  PROCclear
 1050  PROCp(30,1," Finding Pictures ",1)
 1060  PROCp(21,3," Please highlight fields for search ",1)
 1070  PROCinstruct
 1080  PROCalter(0)
 1090  PROCp(26,20,wipe$,0)
 1100  PROCp(26,20,"Output to printer (Y/N)",1)
 1110  IF FNyes VDU 2:printeron=TRUE
 1120  CLS
 1130  PRINT " Pictures which match selected subjects:"'
 1140  P%=-1
 1150  REPEAT :P%=P%+1
 1160  PROCload(P%,0)
 1170  IF suitable PRINT " ";title$;" ";holder%;" / ";picture%
 1180  UNTIL eof
 1190  PRINT " Finished "
 1200  IF printeron VDU 3
 1210  INPUT " Please press RETURN for main menu",A$
 1220  ENDPROC
 1230 :
 1240 :
 1250  DEF PROCbrowse
 1260  CLS
 1270  P%=0
 1280  REPEAT
 1290  PROCload(P%,1)
 1300  CLS
 1310  PROCheaders
 1320  PROCdisplay
 1330  PROCp(20,20," L/R CURSORS = FORWARD/BACKWARD. Q = QUIT ",1)
 1340  *FX15
 1350  I=GET
 1360  IF I=137 P%=P%+1
 1370  IF I=136 P%=P%-(1 AND P%>0)
 1380  UNTIL eof OR I=81
 1390  ENDPROC
 1400 :
 1410 :
 1420  DEF PROCnewdisc
 1430  CLS
 1440  CLOSE#0
 1450  PROCp(26,8," Creating New Data File ",1)
 1460  REPEAT
 1470  $S%=FNfilename
 1480  PROCp(15,12,wipe$,0)
 1490  PROCp(26,12,$S%+" : ",1)
 1500  PROCi:PRINT"Are you sure ";
 1510  UNTIL FNyes
 1520  file=OPENOUT($S%):CLOSE#0
 1530  PROCn
 1540  ENDPROC
 1550 :
 1560 :
 1570  DEF PROCnewname
 1580  CLS
 1590  $S%=FNfilename
 1600  ENDPROC
 1610 :
 1620 :
 1630  DEF FNfilename
 1640  PROCp(15,12,wipe$,0)
 1650  REPEAT
 1660  PROCp(21,12," Filename (7 chars max ) .......   ",1)
 1670  PROCi:INPUT TAB(46,12),file$:PROCn
 1680  UNTIL LEN (file$)
 1690  IF LEN (file$)>7 file$=LEFT$(file$,7)
 1700  =file$
 1710 :
 1720 :
 1730  DEF PROCi:COLOUR 0:COLOUR 129:ENDPROC
 1740  DEF PROCn:COLOUR 1:COLOUR 128:ENDPROC
 1750 :
 1760  DEF PROCvariables
 1770  quit=FALSE
 1780  printeron=FALSE
 1790  amending=FALSE
 1800  browsing=FALSE
 1810  pointer=FALSE
 1820  suitable=FALSE
 1830  wipe$=STRING$(50," ")
 1840  A$=""
 1850  B$=""
 1860  field$=""
 1870  option$=""
 1880  title$=""
 1890  holder%=0
 1900  picture%=0
 1910  data%=D%
 1920  ENDPROC
 1930 :
 1940  DEF PROCclear
 1950  !data%=0:!(data%+4)=0:!(data%+8)=0:!(data%+12)=0
 1960  ENDPROC
 1970 :
 1980  DEF FNyes
 1990  INPUT A$:IF INSTR("NnYn",LEFT$(A$,1))<3 =0 ELSE =1
 2000 :
 2010  DEF PROCdisplay
 2020  PROCcursor(0)
 2030  PRINT TAB(1,5);
 2040  CALL HIMEM
 2050  ENDPROC
 2060 :
 2070  DEF PROCp(X%,Y%,A$,Z%)
 2080  IF Z% PROCi
 2090  PRINT TAB(X%,Y%)A$;
 2100  PROCn
 2110  ENDPROC
 2120 :
 2130  DEF PROCheaders
 2140  PROCp(1,3," Holder  ",1):PROCp(18,3," Picture no.  ",1):PROCp(40,3," Title  ",1)
 2150  PRINTTAB(11,3)holder%;TAB(33,3)picture%;TAB(49,3)title$
 2160  ENDPROC
 2170 :
 2180  DEF PROCinstruct
 2190  PROCp(1,2," KEYS = cursors, plus (Y)es (N)o (H)older (P)icture (T)itle (D)elete (E)nd ",1)
 2200  ENDPROC
 2210 :
 2220  DEF PROCsave(record)
 2230  file=OPENUP($S%)
 2240  IF record=-1 THEN PTR#file=EXT#file:ELSE PTR#file=record*48
 2250  title$=LEFT$(title$,23)+LEFT$(wipe$,23-LEN(title$))
 2260  PRINT#file,holder%,picture%,title$
 2270  FOR X%=0 TO 12
 2280  BPUT#file,?(data%+X%)
 2290  NEXT
 2300  CLOSE#file
 2310  ENDPROC
 2320 :
 2330 :
 2340  DEF PROCload(record,browsing)
 2350  file=OPENUP($S%)
 2360  PTR#file=record*48
 2370  suitable=TRUE
 2380  INPUT #file,holder%,picture%,title$
 2390  IF holder%=-1 suitable=FALSE
 2400  FOR X%=0 TO 12
 2410  Y%=BGET #file
 2420  IF (?(data%+X%)AND Y%)<>?(data%+X%) THEN suitable=FALSE
 2430  IF browsing ?(data%+X%)=Y%
 2440  NEXT:eof=EOF#file
 2450  CLOSE#file
 2460  ENDPROC
 2470 :
 2480  DEF PROCcursor(X%)
 2490  VDU23,1,X%;0;0;0;
 2500  ENDPROC
 2510 :
 2520  DEF PROCalter(amending)
 2530  A%=0
 2540  PROCdisplay
 2550  PROCn
 2560  REPEAT
 2570  *FX15
 2580  PRINT TAB((A% MOD7)*11+1,(A% DIV 7)+5)"{";:VDU9,9,9,9,9,9,9,9,9:PRINT"}"
 2590  I=GET
 2600  PRINT TAB((A% MOD7)*11+11,(A% DIV 7)+5)" "TAB((A% MOD 7)*11+1,(A% DIV 7)+5)" "
 2610  A%=A%+(1 AND I=137 AND A%<97)-(1 AND I=136 AND A%>0)+(7 AND I=138 AND A%<91)-(7 AND I=139 AND A%>6)
 2620  PRINT TAB((A% MOD7)*11+1,(A% DIV 7)+5)"{";:VDU9,9,9,9,9,9,9,9,9:PRINT"}"
 2630  IF I=89 ?(data%+(A% DIV 8))=?(data%+(A% DIV 8)) OR 2^(A% MOD 8):PROCdisplay
 2640  IF I=78 ?(data%+((A%) DIV 8))=?(data%+((A%) DIV 8)) AND (255-2^((A%)MOD 8)):PROCdisplay
 2650  IF I=72 AND amending PROCcursor(1):PROCp(11,3,"  ",0):INPUT TAB(11,3)holder%
 2660  IF I=80 AND amending PROCcursor(1):PROCp(33,3,"  ",0):INPUT TAB(33,3)picture%
 2670  IF I=84 AND amending PROCcursor(1):PROCp(49,3,wipe$,0):INPUT TAB(49,3)title$
 2680 PROCcursor(0)
 2690  IF I=68 AND amending holder%=-1:picture%=0:title$=" * DELETED * ":PROCclear:PROCheaders:PROCdisplay
 2700  UNTIL I=68 OR I=69
 2710  ENDPROC
 2720
 2730 DEF PROCerror
 2740 IF ERR=17 OR ERR =223 ENDPROC
 2750 VDU7,12
 2760 IF ERR=222PRINT" FILE NOT FOUND "'"ENSURE YOU ARE USING THE CORRECT DISC"'"HAVE YOU CREATED A FILE OF THIS FILENAME?":GOTO2780
 2770 PRINT"ERROR :-";ERR;" AT LINE ";ERL
 2780 PRINT:INPUT "PLEASE PRESS <RETURN> TO CONTINUE",A$
 2790 ENDPROC
```

CALENDAR

```
10 REM Calendar
20 REM By Michael Leete
30 REM for all Acorn micros
40 REM (c) BAU Feb 1990
50 :
60 ON ERROR MODE7:END
70 Kingdomcome=0
80 *FX212,216
90 MODE4
100 VDU19,0,6,0;0;0;
110 VDU19,1,0,0;0;0;
120 PRINTTAB(13,2)"CALENDAR UTILITY"
130 PRINTTAB(14,5)"ESCAPE to Quit"
140 VDU28,0,24,39,7
150 REPEAT
160 N%=0
170 day=0:month=0:year=0
180 pointer=3
190 newyearday=0
200 note$=""
210 Z%=TRUE
220 INPUT'"Enter date as dd,mm,yyyy ";day,month,year
230 IF year<1 VDU7:PRINT'"Sorry, BC dates crack me up!":GOTO 220
240 IF day<1 OR month<1 VDU7:PRINT'"Sorry, no zeroes":GOTO 220
250 IF year>9999 VDU7:PRINT'"If you are serious, alter FNcentennial.":GOTO 220
260 RESTORE 860
270 FOR I%=1 TO month
280 READ month$
290 NEXT
300 IF day MOD10=1 AND day<>11 suffix$="st " ELSE IF day MOD10=2 AND day<>12 suffix$="nd " ELSE IF day MOD10=3 AND day<>13 suffix$="rd " ELSE suffix$="th "
310 PRINT'" ";day;suffix$+month$+" ";year;" AD";
320 PROCeaster(year)
330 pointer=pointer+FNreform
340 pointer=pointer+FNcentennial
350 pointer=(pointer+year) MOD 28
360 RESTORE 780:FOR I%=0 TO pointer
370 READ newyear$
380 NEXT
390 IF LEFT$(newyear$,1)="L" THEN S%=1 ELSE S%=0
400 Z%=FNtrap
410 newyearday=VAL(RIGHT$(newyear$,1))
420 IF S% day=(newyearday+day++VAL(MID$("034025036146",month,1))-1)MOD7 ELSE day=(newyearday+day+VAL(MID$("033614625035",month,1))-1)MOD7
430 IF S% PRINT" (a Leap year)" ELSE PRINT" (a Common year)"
440 IF NOT Z% VDU7:day=7
450 RESTORE 850:FOR I%=0 TO day
460 READ d$
470 NEXT
480 IF year<1990 PRINT" was ";d$;"day" ELSE IF I%=8 PRINT" will not exist." ELSE PRINT"will be ";d$;"day"
490 PRINT'note$
500 UNTIL Kingdomcome
510 END
520 :
530 DEF FNtrap
540 IF day>31 THEN=FALSE
550 IF month=2 AND day>29 THEN=FALSE
560 IF S%=0 AND month=2 AND day>28 THEN=FALSE
570 IF (month=4 OR month=6 OR month=9 OR month=11) AND day>30 THEN=FALSE
580 IF year=1752 AND month=9 AND day<14 AND day>2 note$="Date abolished by Act of Parliament.":=FALSE
590 =TRUE
600 :
610 DEF FNreform
620 IF year<4 THEN =12
630 IF year=4 THEN =-5
640 IF year<1752 THEN =0
650 IF year=1752 AND month<9 THEN =0
660 IF year=1752 AND month>9 THEN =8
670 IF year=1752 AND month=9 AND day<3 THEN =0
680 =8
690 :
700 DEF FNcentennial
710 Y%=0
720 IF year>1799 THEN FOR I%=1800 TO year STEP 100 ELSE=Y%
730 IF I% MOD 400<>0 Y%=Y%+16
740 NEXT
750 IF year MOD100=0 AND year MOD400 Y%=Y%+17
760 =Y%
770 :
780 DATA C1,C2,C3,L4
790 DATA C6,C0,C1,L2
800 DATA C4,C5,C6,L0
810 DATA C2,C3,C4,L5
820 DATA C0,C1,C2,L3
830 DATA C5,C6,C0,L1
840 DATA C3,C4,C5,L6
850 DATA Sun,Mon,Tues,Wednes,Thurs,Fri,Satur,"not a "
860 DATA January,February,March,April,May,June,July,August,September,October,November,December
870 :
880 DEF PROCeaster(N%)
890 IF N%<1753 ENDPROC
900 A%=N% MOD 19
910 B%=N% DIV 100
920 C%=N% MOD 100
930 D%=B% DIV 4
940 E%=B% MOD 4
950 F%=(B%+8) DIV 25
960 G%=(B%-F%+1) DIV 3
970 H%=(19*A%+B%-D%-G%+15) MOD 30
980 I%=C% DIV 4
990 K%=C% MOD 4
1000 L%=(32+2*E%+2*I%-H%-K%) MOD 7
1010 M%=(A%+11*H%+22*L%) DIV 451
1020 P%=(H%+L%-7*M%+114) DIV 31
1030 Q%=(H%+L%-7*M%+114) MOD 31
1040 IF P%=month AND Q%+1=day THEN note$=" Easter Day." ELSE note$=""
1050 ENDPROC
```

FILE CONVERSION

```
10 REM Ascii to EBCDIC
20 REM by Graham Kendall
30 REM for all Acorn micros
40 REM (c) BBC Acorn User
50 :
60 PROCinit
70 REPEAT
80 PROCopenFiles
90 PROCcvrt
100 ans% = FNask
110 UNTIL ans%=FALSE:END
120 :
130 DEF PROCinit
140 DIM trans%(255)
150 FOR I% = 0 TO 255:READ trans%(I%):NEXT
160 ENDPROC
170 :
180 DATA &00,&01,&02,&03,&37,&2D,&2E
190 DATA &2F,&16,&05,&25,&0B,&0C
200 DATA &0D,&0E,&0F,&10,&11,&12
210 DATA &13,&3C,&3D,&32,&26,&18
220 DATA &19,&3F,&27,&1C,&1D,&1E
230 DATA &1F,&40,&4F,&7F,&44,&5B
240 DATA &6C,&50,&7D,&4D,&5D,&5C
250 DATA &4E,&6B,&60,&4B,&61,&F0
260 DATA &F1,&F2,&F3,&F4,&F5,&F6
270 DATA &F7,&F8,&F9,&7A,&5E,&4C
280 DATA &7E,&6E,&6F,&7C,&C1,&C2
290 DATA &C3,&C4,&C5,&C6,&C7,&C8
300 DATA &C9,&D1,&D2,&D3,&D4,&D5
310 DATA &D6,&D7,&D8,&D9,&E2,&E3
320 DATA &E4,&E5,&E6,&E7,&E8,&E9
330 DATA &4A,&E0,&5A,&5F,&6D,&79
340 DATA &81,&82,&83,&84,&85,&86
350 DATA &87,&88,&89,&91,&92,&93
360 DATA &94,&95,&96,&97,&98,&99
370 DATA &A2,&A3,&A4,&A5,&A6,&A7
380 DATA &A8,&A9,&C0,&6A,&D0,&57,&07
390 DATA &20,&21,&22,&23,&24,&15,&06
400 DATA &17,&28,&29,&2A,&2B,&2C
410 DATA &09,&0A,&1B,&30,&31,&1A
420 DATA &33,&34,&35,&36,&08,&38
430 DATA &39,&3A,&3B,&04,&14,&3E
440 DATA &E1,&41,&42,&43,&7B,&45
450 DATA &46,&47,&48,&49,&51,&52
460 DATA &53,&54,&55,&56,&A1,&58
470 DATA &59,&62,&63,&64,&65,&66
480 DATA &67,&68,&69,&70,&71,&72
490 DATA &73,&74,&75,&76,&77,&78
500 DATA &80,&8A,&8B,&8C,&8D,&8E
510 DATA &8F,&90,&9A,&9B,&9C,&9D
520 DATA &9E,&9F,&A0,&AA,&AB,&AC
530 DATA &AD,&AE,&AF,&B0,&B1,&B2
540 DATA &B3,&B4,&B5,&B6,&B7,&B8
550 DATA &B9,&BA,&BB,&BC,&BD,&BE
560 DATA &BF,&CA,&CB,&CC,&CD,&CE
570 DATA &CF,&DA,&DB,&DC,&DD,&DE
580 DATA &DF,&EA,&EB,&EC,&ED,&EE
590 DATA &EF,&FA,&FB,&FC,&FD,&FE,&FF
600 :
610 DEF PROCopenFiles
620 REPEAT CLS:PROCcn("ASCII to EBCDIC CONVERSION",2)
630 PROCcn("Please enter file to be converted"+CHR$(&0A)+CHR$(&0D),10):INPUT INP$
640 UNTIL FNinputOk(INP$)
650 REPEAT CLS:PROCcn("ASCII to EBCDIC CONVERSION",2)
660 PROCcn("Please enter output file"+CHR$(&0A)+CHR$(&0D),10):INPUT OUT$
670 UNTIL FNoutputOk(OUT$)
680 ENDPROC
690 :
700 DEF FNinputOk(t$)
710 IN% = OPENIN(t$)
720 IF IN% = 0 THEN PROCerr("File does not exist"):IND%=FALSE ELSE IND% =TRUE
730 = IND%
740 :
750 DEF FNoutputOk(t$)
760 OUT% = OPENOUT(t$)
770 IF OUT% = 0 THEN PROCerr("Error in opening output file"):IND%=FALSE ELSE IND% =TRUE
780 = IND%
790 :
```

Continued ▶

FILE CONVERSION

◀ Continued

```
800 DEF PROCcvrt
810 REPEAT
820 P%=trans%(BGET#(IN%))
830 BPUT#OUT%,P%
840 UNTIL EOF#IN%
850 CLOSE#0
860 ENDPROC
870 :
880 DEF FNask
890 REPEAT CLS:PROCcn("ASCII to EBCDIC CONVERSION",2)
900 PROCcn("Do you want another file converted",10):A%=INSTR("YyNn",GET$)
910 UNTIL A%>0
920 IF A%=1 OR A%=2 THEN A%=TRUE ELSE A%=FALSE
930 CLS:=A%
940 :
950 DEF PROCerr(t$):PROCcn(t$,22)
960 PROCspace
970 ENDPROC
980 :
990 DEF PROCcn(t$,Y%)
1000 LOCAL X%:X%=19-LENt$/2
1010 PRINTTAB(X%,Y%)t$;:ENDPROC
1020 :
1030 DEF PROCspace
1040 PROCcn("Press Space to continue",24)
1050 REPEAT UNTIL GET=32
1060 ENDPROC
```

TRIANGLES

Listing 1

```
10 REM >Lines
20 REM by M Attenborough
30 REM for Arc only
40 REM (c) BAU Feb 1990
50 :
60 len%=20
70 MODE 12+128
80 ON ERROR GOTO 360
90 OFF:ORIGIN 640,512
100 *FX112,1
110 *FX113,1
120 T%=0:SCR%=1:len%=len%*2
130 CLS:PROCswap:GCOL 3,3
140 REPEAT
150 PROCcalc(len%):GCOL 3,1:LINE A%,B%,C%,D%
160 GCOL 3,4:LINE E%,F%,G%,H%
170 IF T%>=len% THEN
180 PROCcalc(0):LINE E%,F%,G%,H%
190 GCOL 3,1:LINE A%,B%,C%,D%
200 ENDIF
210 PROCswap:T%+=1
220 UNTIL FALSE
230 :
240 DEF PROCcalc(Q%):Q%+=T%
250 A%=500*COS(Q%/47):B%=500*COS(Q%/31):C%=500*COS(Q%/41):D%=500*COS(Q%/29)
260 E%=500*COS(Q%/43):F%=500*COS(Q%/37):G%=500*COS(Q%/33):H%=500*COS(Q%/45)
270 ENDPROC
280 :
290 DEF PROCswap
300 SYS "OS_Byte",112,SCR%
310 SCR%=SCR% EOR 3
320 REPEAT UNTIL TIME>2
330 WAIT:SYS "OS_Byte",113,SCR%
340 TIME=0:ENDPROC
350 :
360 ON ERROR OFF
370 *FX 112,0
380 *FX 113,0
390 REPORT:PRINT;" at line ";ERL
400 ON:END
```

Listing 2

```
10 REM >Triangles
20 REM by P Cook and
30 REM M Attenborough
40 REM for Arc only
50 REM (c) BAU Feb 1990
60 :
70 solid%=TRUE
80 MODE 12+128
90 ON ERROR GOTO 320
100 OFF:ORIGIN 640,512
110 *FX112,1
120 *FX113,1
130 IF solid% THEN S%=0 ELSE S%=1
140 T%=0:SCR%=1:CLS:TIME=0
150 REPEAT
160 A%=500*COS(T%/47):B%=500*COS(T%/31)
170 C%=500*COS(T%/41):D%=500*COS(T%/29)
180 E%=500*COS(T%/43):F%=500*COS(T%/37)
190 GCOL 1:MOVE A%,B%:MOVE C%,D%:PLOT 85,E%,F%
200 GCOL S%,2:MOVE -A%,-B%:MOVE -C%,-D%:PLOT 85,-E%,-F%
210 GCOL S%,4:MOVE -B%,A%:MOVE -D%,C%:PLOT 85,-F%,E%
220 GCOL S%,S%+3:MOVE B%,-A%:MOVE D%,-C%:PLOT 85,F%,-E%
230 PROCswap:T%+=1
240 UNTIL FALSE
250 :
260 DEF PROCswap
270 SYS "OS_Byte",112,SCR%
280 SCR%=SCR% EOR 3
290 WAIT:SYS "OS_Byte",113,SCR%
300 CLS:ENDPROC
310 :
320 ON ERROR OFF
330 *FX 112,0
340 *FX 113,0
350 REPORT:PRINT;" at line ";ERL
360 ON:END
```

BLUNDERBOX

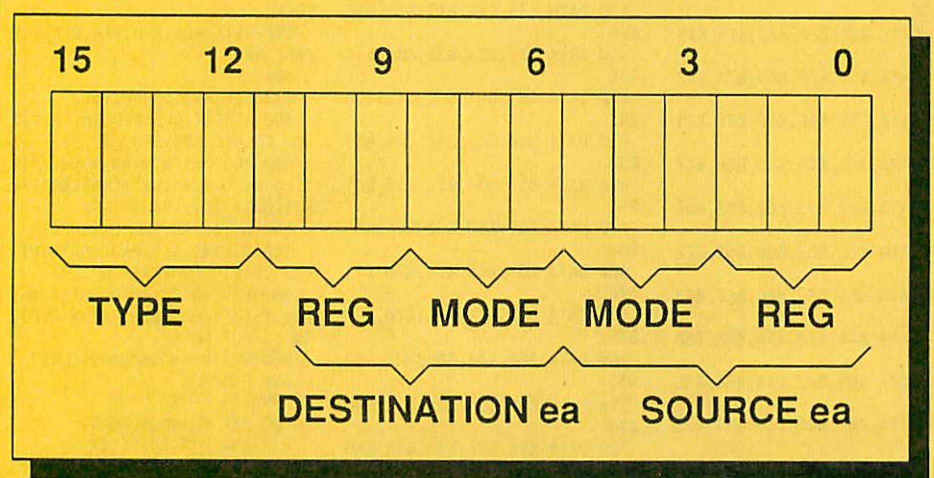


Figure 1 in December"s 'Copy Cats' article should have read as the diagram on the left.

The address register 7 of the 68000 processor (refered to at the bottom of page 76) should be the stack pointer and not, the program counter. Full marks to Richard Browning for spotting these mistakes.



The Beebs of *BAU* are pining and the Arcs aching for your programs. If you have written an application in BBC Basic or assembler suitable for publication in *BBC Acorn User*, we want to know about it.

Of course you may just have hit upon the best programming technique since sliced yoghurt. We want to know about that too. If you can tell the rest of us a thing or two, what better way to do so but in the pages of the biggest, brightest and best Acorn mag in all Christendom?

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So, don't delay. Send in your programs (on disc please, along with a stamped addressed envelope if you want the disc returned) and a brief description of what, why and how the program does whatever it does, to:

The Editor
BBC Acorn User
20-26 Brunswick Place
London N1 6DJa

BBC ACORN USER
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BBC ACORN USER Offers of the Month

The main offers this month are a handy electronic pocket organiser and three superb portable electronic games computers, with a total saving of £40! But, please remember that they will only be available for a limited period. So, to avoid disappointment, place your order soon.

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Targeted at beginners to intermediate players it will help you improve your skills of bidding, playing and recall. While, if you are an advanced bridge player, the Bridge Computer will help you to keep your hand in.

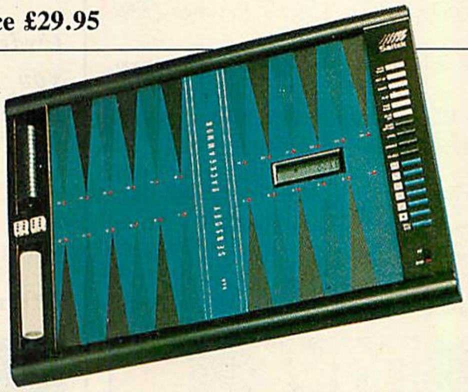
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Sam1 — *Citadel, Thrust, Stryker's Run, Ravenskull*

Sam2 — *Repton 3, Crazee Rider, Galaforce, Codename Droid*

Sam3 — *Commando, Place of Magic, Killer Gorilla, Killer Gorilla 2*

Sam4 — *Frak, Spellbinder, Cosmic Camouflage, Grand Prix Construction Set (BBC), Guardian (Electron)*

Sam5 — *Imogen, Elixir, Bug Blaster, Fortress (BBC), Moonraider (Electron)*

Sam6 — *Galaforce 2, Hunchback, Hopper, The Sentinel (BBC), Video's Revenge (Electron)*

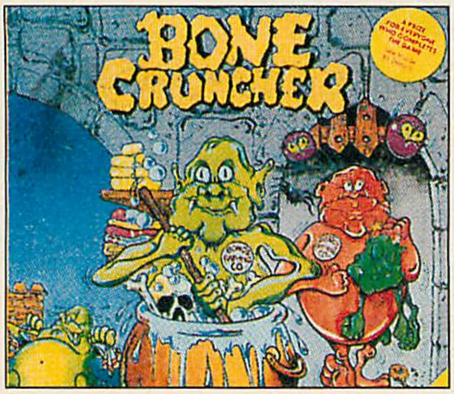
Sam7 — *Firetrack, Bonecruncher, Snapper, Ghouls*

Sam8 — *Winter Olympiad 88, Quest, Around The World In 40 Screens, Mr. Wiz*

Sam9 — *Camelot, Steve Davies Snooker, Spycat, The Life Of Repton*

Sam10 — *Repton Thru Time, 3D Dotty, Zalaga, Qwak*

Cassette £9.95, 5.25in Disc £11.95, 3.5in Disc £14.95



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QUESTION OF SPORT

Play TV's most popular sports quiz, for less than half price!

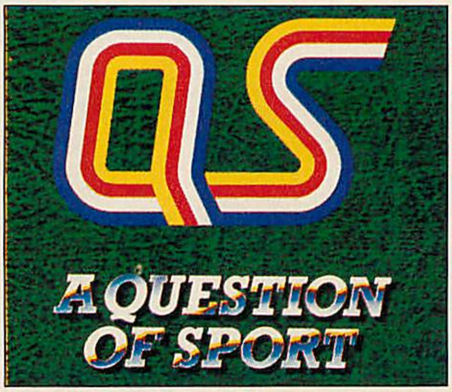
With David Coleman asking the questions and Ian Botham and Bill Beaumont heading up the teams, you can pit your wits against your family and friends, or even challenge your BBC micro.

There are six exciting and fast-moving rounds, including Pictureboard, Mystery Personality and a Quickfire round.

If you've always fancied yourself as a bit of a sports fanatic, this is the program that will thoroughly test your knowledge.

Order your copy today and see if you can beat the professionals at their own game

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The computer version of *Trivial Pursuit* is faithful to the original board game. The object being to travel around the board answering questions and trying to collect a wedge for each of the six subjects.

The questions are asked by a cute character called TP, while the screen layout shows the board along with the progress of each player.

Don't worry about running out of questions. There are enough in this set to keep you wracking your brains through many sessions.

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Race games are highly motivating and successful at developing essential estimation skills through multiplication. Young children race a bicycle with numbers 0-10 whilst older children drive a racing car and deal with numbers 0-9999. It is a race against time. A sum appears at the top of the screen with four possible answers. The driver estimates the sum and moves the vehicle to the correct lane. To win the race, players estimate the closest answer to several sums.



5.14 years.
RRP £18.40
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CRANKY

An entertaining game where children mend a faulty calculator by creating addition and subtraction sums. The reward is a working calculator to use in their own work. Faults appear in a 0-100 number square and are mended by building sums using two given numbers. For example using numbers 3 and 5, fault 18 is mended. by 3+3+3+3+3+3 or 5+5+5+3. Fun for all developing strategy and computation skills.

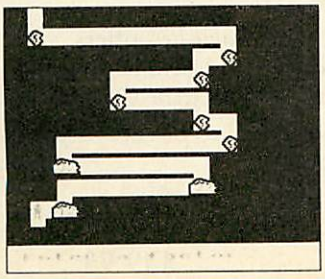
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Four games to help children get to grips with multiplication and factorisation. Games become progressively harder to encourage self-improvement. Prime numbers and common factors of numbers 1-100 are covered.

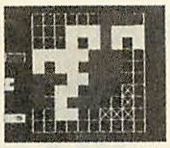
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SQUEEZE

Help children grasp basic geometric concepts. Working together they visualise and discuss how shapes relate to each other and rotate, reflect and slide shapes in a given space to complete puzzles.

5-12 years.
RRP £18.40
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NUMBER PAINTER

Designed as an arcade game it is exciting to play for all ages. Move up and down the ladders collecting numbers to make your target — but beware of the holes! You have three lives. Success is dependent on speed and accuracy of mental arithmetic. Addition, subtraction, multiplication and division are practised and all abilities catered for in 12 levels dealing with 1-10 or 1-1000. You control the speed of the game.



5-14 years.
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PAZAZZ

Use *Pazazz* and you'll be surprised just how much valuable work children get from one program.

Children work in groups designing and creating a figure, a scene, composing music and animating the figure for a *Pazazz* performance. You only need one computer, as groups prepare work away from the computer, before they link their work together to make a complete performance.

Four entertaining performances are included, showing how sophisticated *Pazazz* performances can become.



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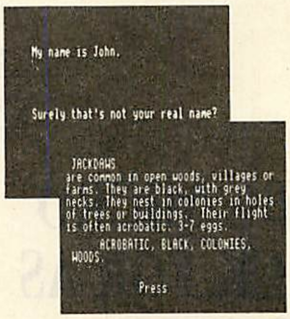
CRACK-IT

Children truly enjoy the challenge of reading coded messages. many will simply guess at letters whereas the successful code reader will use knowledge of high frequency letters, be aware of letter patterns in words and predict words form the positioning of letters in a word. Two secret messages are included to challenge you at first, then write and save your own. Your children will have fun writing coded messages for each other.

7-13 years.
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NOTICEBOARD AND CHATTERBOX

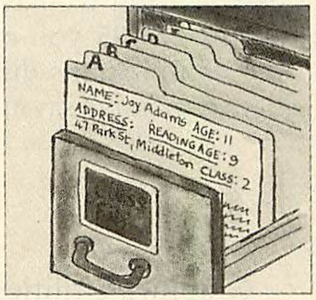


NOTICEBOARD. Create, store retrieve and display short pieces of writing. Similar to a wordprocessor and database. It's simplicity makes it quite unique. A database of British birds is included so investigations like 'What are scavengers?' or 'What birds are speckled?' can be made for reference in classroom work. New databases are easy to make for book reviews, local information or other topic work.

CHATTERBOX. Teach your computer to speak and have a conversation. Ideal for discussion, vocabulary and language structure.

9-13 years.
RRP £22.94
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SUPASTORE PLUS



SUPASTORE PLUS

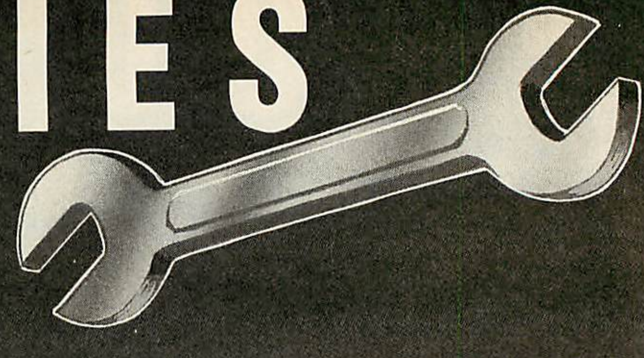
SupaStore provides all you need for creating, storing and sorting information. The BBC version includes 16K rom, 2 floppy discs (sample database, utility disc), user guide, keycard. The Compact and Archimedes version includes utilities and sample databases on one 3½in disc, user guide and keycard.

SupaStore Plus gives you all the features of *SupaStore* and more. It contains *SupaStore* and an extra disc. You can modernise your old database system by using files from *Quest, Grass* or *Viewstore* and edit, or add to these files. It includes efficient editing facilities — when you delete records the library is compacted and records are renumbered, so blank records do not appear. It's ideal for personalised letters and detailed reports. You create your own layout for reports, so they appear printed in the format appropriate for your needs. Simply merge *SupaStore* files with any main wordprocessors eg, *Wordwise, View, Edword.* You can also include numerical fields and make simple calculations. It speeds up editing. You can delete, change or append information automatically on a collection of records; delete a group of records and compact the remaining ones; combine two separate databases. You can upgrade your databases from DFS to ADFS if you upgrade your hardware.

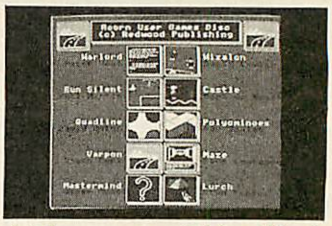
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UTILITIES



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★ Please note: This offer is only available on 5.25in format

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OFFER PRICE

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Once installed you can call it from your own programs with simple-to-use commands. Plus you can fully configure it to speak in any accent or pitch.

And you can teach it how to pronounce unusual words and phrases — adding them to the built-in dictionary — customising ***Speech!*** to your own requirements.

Due to a bulk purchase we can offer this unique program to you for less than half price. But place your order soon as they're sure to be in high demand.

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Please note: ***Speech!*** is not compatible with the Electron

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The Publisher is a remarkably easy to use and powerful Desk Top Publishing package, featuring its own page description language, allowing you to operate it from within *Wordwise, Wordwise Plus, View, Inter-Word* or *Wordpower,* and giving you total control over the layout of your documents.

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Combined with the 86 fonts, *The Publisher* offers you everything you need to produce professional-looking results — all in one package, and for less than £50!

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ELECTRON

PERK UP YOUR PRINTOUTS

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The whole package comes on two 16K roms which can be fitted to a cartridge or into the Slogger Rom Box or Rom Box +, plus you get a powerful font designer so you can create your own fonts.

But please remember, the *NTQ* system will only be available at the special price of £19.95 for a limited period, so place your order soon.


PMS MULTI-FONT NTQ
NEAR TEXT QUALITY
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THE SOFTWARE YOUR DOT-MATRIX PRINTER HAS BEEN WAITING FOR.

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As you can see this is not simply another NLQ utility!

Whether you use your printer to produce WORKSHEETS, MENUS, LEAFLETS, TICKETS, LABELS, CONCERT PROGRAMMES, POSTERS, SCHOOL, CHURCH or CLUB NEWSLETTERS, PRICE LISTS, HEADED NOTEPAPER, BUSINESS CARDS or you simply want to add STYLE to your personal letters - PMS Multi-Font NTQ is what you have been looking for.

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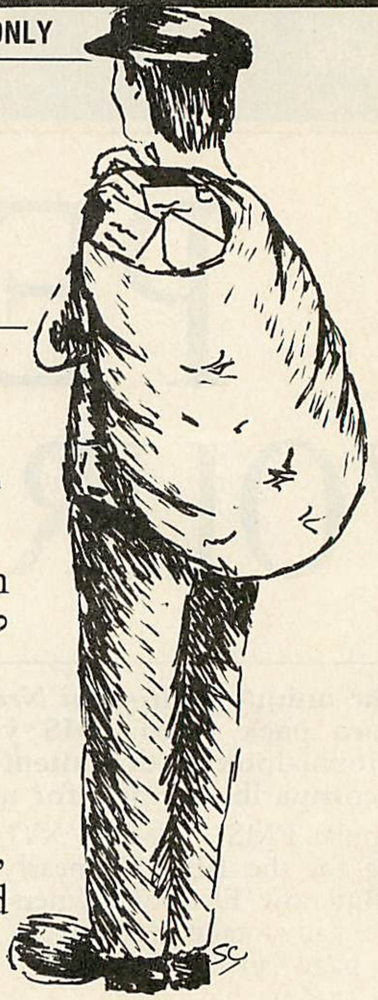
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You know that *BBC Acorn User's* yellow pages consistently bring you the best in new software for your BBC or Archimedes each month.

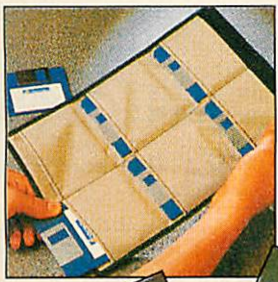
But why not save the wear and tear on your fingers, and get programs that work the first time by ordering this month's disc.

As usual it's packed with plenty of software for everyone, ranging from handy utilities to challenging games.

Alternatively, see the subscriptions page in this mail order section for an extra special offer that can save you up to £50.

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There are a huge number of data handling packages available for the BBC micro. **DAVE FUTCHER** looks at the history of databases and then recommends the best

SET STORE BY YOUR BEEB

Everyone keeps information they expect to use again. At the simplest level it could be a list of names, addresses and telephone numbers, a set of references to magazine articles, the stock of a retail shop or a list of business transactions and customers.

If you work in the worlds of business or education, even if you have never touched a computer, it is highly likely you use a database – a database is just a store of organised information.

The micro has opened up convenient ways of storing information and a database handling package stores, sorts and presents the information.

During the last seven years, BBC micro owners have had an array of data handling packages available to them: *Masterfile II*, *Viewstore* and *System Delta* have attracted most of the attention but other packages have come and gone.

December 1982 saw the launch of Beebugsoft's *Masterfile* – probably the first BBC database. The cassette version cost just £6.95. It was described at the time as a general purpose file management program and was the forerunner of *Masterfile II* – the random access disc database package first released at the end of 1984. Amazingly, this is still available today and remains ever-popular.

Gemini Software was the first company to concentrate on business software for the BBC micro. Included among it's *Cash Book Accounts*, *Stock Control* and *Beebcalc* spreadsheet packages was the *Gemini Database*. This cost £17.35 in May 1983 and it survives today (improved slightly) as Watford Electronics' *Office Mate* package.

It's a rather basic introductory package, and is more useful to schools starting data-handling than it is in real business.

Many of the early packages for the BBC model B have long since disappeared along with their publishers. Popular in their time were Primasoft's *Database* and the *Cardiff Datafile*. The *Record Changer* from AJ Software was able to cope with indexing, membership lists, inventories and directories.

One of the most popular early database handling packages was *Vu-file* from Psion, who released a similarly named package for the Sinclair Spectrum. *Vu-file* used optimised packing routines to maximize file storage and provide efficient operation. Its most popular feature was how the records could be defined on screen by the user with great flexibility.

Ian Trackman, the consultant for the BBC TV series *The Computer Program* and *Making the most of the micro*, also wrote one of the early programs designed to store and retrieve information. This was called *Record Keeper* – published by BBC Soft of course.

Acornsoft too had some early tape based filing packages. These included its own simple *Database* and a number of programs like *Collectors Catalogue* and *Membership Manager*.

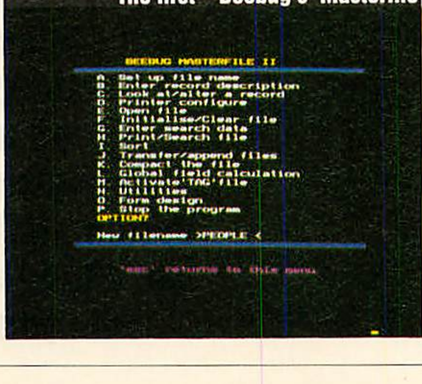
Beebug's *Master-file II*, launched in 1984, rapidly became one of the most popular database packages for the Beeb. Today many people still prefer it to the Rom based systems available.

The current version is 1.17 and there is also a version specially designed to make use of ADFS. All the standard database tasks are performed well, the global field calculation routine is excellent and label printing is good.

In addition there is a flexible form design feature for designing non-standard print layouts, ideal for invoices or letters, and easy access to *Wordwise Plus*.

Early versions of *Masterfile* suffered from a rather slow sort, but the addition of tag sorting improves it considerably. The tag sort leaves the datafile untouched but creates another file containing a list of the order of access of the records on the main file. *Masterfile II* has also grown with the developments in BBC hardware and users of the Master 128 and Compact can use the 64K of sideways Ram for tag sorting.

The first – Beebug's Masterfile



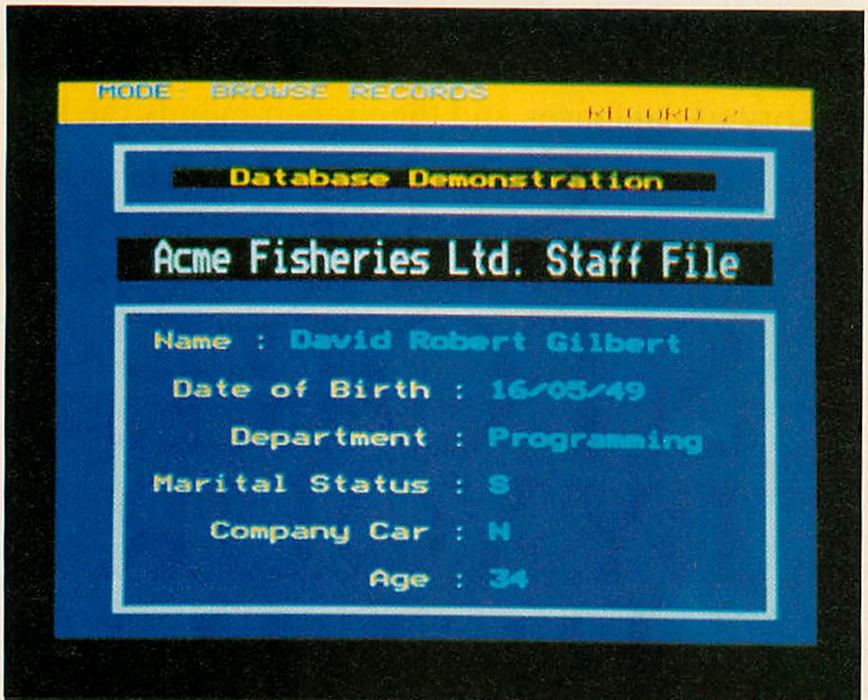
Beta-base from Clares is one of the few early BBC packages still on sale. In fact it is the forerunner of the successful Archimedes *Alpha-base*. It is completely menu driven and is a joy to use. *Beta-base* comes into its own when searching through a file. You are not asked to select a key field – instead records within a file can be interrogated by up to five selected fields each with a particular search criteria.

The same applies on sorting a file: it can be done on any field. With *Beta-base* it is also easy to create or sort a subset the same size as the original file and if necessary save it under a different name. You can also transfer complete or part files to another file and merge files together.

Formatting the output with *Beta-base* is a little tricky until you get used to the system, but thereafter you really value the flexibility that *Beta-base* offers.

By far the most powerful of the disc based data handling package available for the BBC micro is *MPSS* – Monitoring Package for Social Systems. *MPSS* was first released in 1984 and is still available for the BBC micro, although the latest version is a native mode version for the Arc.

This package can be best described as a truly sophisticated electronic filing system



The Gemini Database – now available from Watford

capable of handling large amounts of information quickly. It has the ability to open up to four files at once and to handle large files of data – as large as the disc drive space available. Searches are possible on any field or combination of fields. Rapid searches are made possible by the use of hash tables.

Although used in many educational institutions for administration, the package has found particular favour in Social Services departments. It has also been used extensively in the health service.

By 1985 Rom based databases came of age. Probably the first Rom based package for the BBC micro was *Starbase* from GCC of Cambridge. Its 16K Rom offered card index functions, ready to use reporting and a semi-programmable capacity.

This had a ready-to-run menu driven core for creating and editing datafiles. A number of other routines were provided on disc. These covered the printing of information and calculations on the database.

Unlike most other database programs, it is necessary with *Starbase* to dedicate one whole side of a disc for a single *Starbase* file. The whole disc is specially formatted by the firmware and a few special files are created. This means the physical position of each record is stored in a bit-mapped file so records can be quickly retrieved. Unfortunately, when *Starbase* is used for small files the package is particularly wasteful of disc space.

The announcement of *Datagem* by Gemini Marketing (the publishers of the orginal *Gemini Database*), in the middle of 1985 caused maximum excitement to all database users. This was the first ever 24K Rom based piece of firmware and costed £129.95 – also a BBC software record.

Datagem consisted of an 8K and a 16K Rom mounted on a carrier board plugged into a normal sideways Rom socket. *Datagem* differed considerably from *Starbase* and *File-Plus* in that it held all its routines in machine code in Rom, which made it particularly fast. Unfortunately the exciting possibilities of *Datagem* were let down by its user interface. It required a lot of complex key strokes to perform operations and many of its menus were very long – *Datagem* made no use of the function keys.

Finally, in 1985 Acornsoft added the database package everyone was waiting for. The *View* family was complete at last! The new member was called *Viewstore*. Its release certainly set new standards for database packages with the BBC micro and has stood the test of time. It's as popular today as when released.

But this is no wonder. *Viewstore* offers true 80 column display and is not menu controlled like most of the other packages. It uses the command screen style of *View* and *Viewsheet*.

Viewstore is different from earlier databases in that the field length can be greater than the display width. This is because of the package's ability to scroll in the field window. The maximum field length for alphanumeric and text fields is 239 characters and the maximum number of fields is 254.

The field data in a *Viewstore* database can vary in length so disc storage efficiency can be higher than the more usual uniform length records. The maximum size of a *Viewstore* datafile is 4096Mb but the actual size is dictated by the disc or disc filing system capacities.

Viewstore has two data displays – card and sheet. In the card layout mode the screen displays the maximum number of records that will fit. The design of the card is determined by the user and is effected by a system of marking and placing fields using the cursor keys.

In the sheet mode, the screen scrolls sideways field-by-field and up and down using the cursor keys. The displayed width of each field can be set by the user and although fields can be up to 239 characters, you can arrange to display only the part you want to see, with more fields on screen at one time.

Viewstore is capable of direct random access via multiple indexes. This compares with the single hash coded key field of *Starbase* and no indexes in *Datagem*. More importantly, *Viewstore* is able to keep up to nine indexes up-to-date, and with its index utility it can create additional read-only ones too.

Outputting the data from *Viewstore* can be done to a spooled file or sent to a printer. There is also a report utility which can give a simple listing or one of a user defined format. These can be very complex with totalling and sub-totalling of numeric fields and calculations using number registers. The results can also be sent to a linking file that can be read into *Viewsheet*.

As well as being controlled from the keyboard, *Viewstore* can be driven by *EXEC files which, when saved as programs, enable complex operations to be carried out automatically.

Viewstore is certainly powerful and relatively easy to use if you take your time to come to terms with what is on offer. Its performance will go beyond what virtually all the BBC users will want from their database handling packages. Its only real limit is in not being programmable.

The next step came in 1986 with *System*

Remember, your needs will change so it's wise to consider buying a database system that can change with you

Delta from Minerva. This is much more than just a database package. It offers all that is necessary to build a highly customised database system.

The package is based around a 16K Rom which provides about 150 machine code routines. It is these commands that look after all the difficult aspects of writing your own database software – setting up, editing, file handling and searching.

System Delta is supplied with an application called 'Card Index' which is a menu-driven database management system for creating flat datafiles.

Any program written with *System Delta* can cope with up to 8160 records of up to 255 fields with a maximum of 200 characters. The standard display is mode 7 but this can be 200 characters wide or high and scrolled vertically and horizontally. *System Delta* is also capable of multi-file operations – it can cope with five files at one time, enabling truly relational databases to be set up and interrogated.

The Card Index program that comes with *System Delta* is ready to use and does show the power of the firmware.

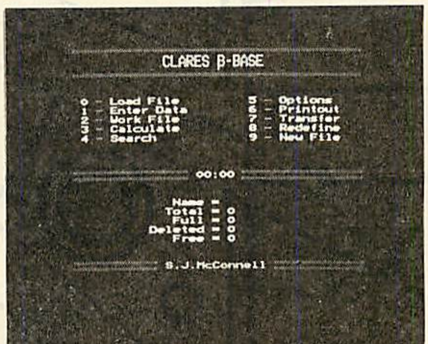
System Delta is not a beginner's database. It is for experienced users prepared for hard work. However, once your own applications have been developed the trouble taken will be richly rewarded.

Since its release, Minerva has fully supported *System Delta* and has written specialised packages, including a school administration system, accounts package and a video rental system.

After a long wait, Computer Concepts finally completed its *Inter* series of Rom-link based application software with the release of *Interbase*. At 64K it is the largest Rom based application written for the BBC micro.

Interbase includes its own programming language with a set of commands especially for file and database handling. It also has a built-in card index program to handle databases of single flat files.

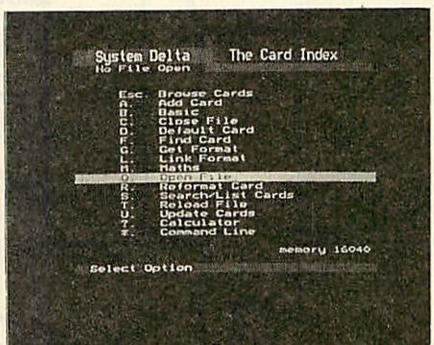
Interbase's Card Index allows variable length records, optionally indexed on single or multiple fields. This is secondary to the package's main function but it is a useful flat file database package which allows powerful searches to be defined. Because of the unlimited numbers of indexes these can be repeated very quickly.



Clares' Betabase – oldie but goodie



Acorn's Viewstore completes the family



Minerva's System Delta



Computer Concept's Interbase

The *Interbase* language is much like an extension of BBC Basic. Alongside improved commands and better string handling are many new commands such as loop and control statements like WHILE... ENDWHILE and CASE... ENDCASE.

With its combined language and database comands, *Interbase* can be used to create truly powerful database applications. These can even be configured to run in sideways Ram. Although many users will never venture beyond the built-in Card Index, for those who do, *Interbase* offers great possibilities in terms of custom designed databases. However, if you cannot master the language, it can be a limiting package. Writing a package to just imitate *Viewstore* would need much hard work! But what must not be forgotten is the tremendous potential that *Interbase* has for integration, especially the transfer of data between it and the rest of Computer Concepts' *Inter* series.

All in all

So, if you have not already got software to sort your data or you are considering upgrading, which to choose? The range of prices is £20-70, but the choice should depend more on what data handling you are envisaging.

If you want a simple system for 'domestic' use, like address lists and telephone numbers, *Masterfile II* is ideal.

For something more powerful than the simple 'cardbox' type of database, *Viewstore* is first class, especially so if your enquiries and reports are largely predefined. But if you have an application that needs to work with several thousand records and there is frequent searching and sorting, *System Delta* could be the answer, particularly if there is an off-the-shelf application package available.

Masterfile and *Viewstore* have tens of thousands of users. These users are attracted by ease of use and good support. *System Delta* is a more specialised product.

All the packages mentioned in this article will help you handle your data well, but do remember that your needs will change and you may need to consider the purchase of a system which can change with you.

Comparing the features of the main Beeb database packages

Package	BetaBase	Interbase	Masterfile	System Delta	Viewstore
Publisher	Clares	Computer Concepts	Beebug	Minerva	Acorn
Price	£25	£69	£22	£64.95	£59.80
Format	Disc	Rom	Disc	Rom	Rom
Tube compatible	o	.	o	.	o
No.files open	1	1	6	5	1
Text field size	254	255	255	200	239
No.fields/record	200	32000	18	255	254
Record size	2048 bytes	memory	4600	8000 bytes	memory
Maximum file size	65000	4096Mb	no limit	no limit	4096Mb
Number of records	65000	no limit	no limit	8160	no limit
Number of indexes	750	no limit	no limit	1	no.fields
Programable language	.	o	.	o	.
Export data	Ascii	InterSeries	Ascii	extra	ViewSheet



BETTER BY CAD

If you're looking for a good draughting package for your Master 128, that won't break the bank, then TechnoCad is what you're after says **MARTIN MOORE**

It is only a little exaggerated to say Technomatic has almost achieved the proverbial 'blood from a stone' trick with the new draughting package for the Master 128, *TechnoCad.*

So many earlier packages relied heavily upon the facilities of weighty manuals, and often to become efficient the operator would have to be either highly proficient at locating relevant sections within the literature or capable of remembering an almost impossible range of cryptic commands even to achieve something as basic as 'page set up'.

Some users will wade through the text and at the end of several hours will become so disillusioned, the package may not even be run. Others will bash on, oblivious to the manual and because of the inevitable initial short-lived failures, rapidly become frustrated and disheartened.

This is far from the case with *TechnoCad.* Once the user's initial interest is captured and the need arises for greater flexibility, more facilities await discovery within a clear and precise user guide.

During my initial investigation and trials several 'guinea pigs' (who were virtual novices to the world of computer aided draughting) achieved sufficiently good results to merit a plot out of their work within less than 30 minutes of starting up.

The excellent use of 'pop up' menus gives instant access to a plethora of utilities and setup/editing procedures which are successfully organised into a very logical format – mainly due to the ADFS facilities of the BBC Master.

Working through the system of menus actually gives the operator an interesting insight into the structure of a hierarchical filing system. This alone will be a major breakthrough for some users!

The *TechnoCad* screen display is kept very simple. There are no tool or utility lists to clutter the drawing area. I have experienced very little BBC software (within this price range) to rival the pop up system utilised in *TechnoCad*, a feature many users who have to cope with more than one system will already appreciate.

In fact, as a late MS-Dos convert who has worked with at least six different machines and through four operating systems over the past two years, the prospect of giving up my trusty Archimedes for a BBC Master left me cold. However, *TechnoCad* is actually not too divorced from some of the basic facilities of more

'advanced' operating interface systems and so the transition was not nearly as traumatic as I had anticipated.

The writers of *TechnoCad* have made excellent use of the facilities of the BBC Master. Full use is made of the 128K of Ram and a quick *ROMS shows the user just where all the diagram and icon data is stored.

TechnoCad is supplied on disc along with a plug in Rom cartridge and comes ready to draw with default settings configured to the keyboard. Cursor movement along with the main functions of marking current cursor position, calling and selecting from the menus and deleting or terminating an activity may also be controlled via a mouse or trackerball.

Once either of these is selected through the setup menu, the package successfully boots up every time while still leaving the cursor keys available for more accurate positioning needs.

Personally, I never found this to be necessary as the powerful zoom facilities available straight through the main menu (which still leaves the full editing and drawing facilities available at any zoom setting) proved to be more than adequate.

Drawings up to 841x1189mm may be created either as a single screen at a magnification of one and zooming in to the required drawing area or by constructing the drawing as several windows, made available through panning the screen to create a very large drawing and zooming out at a magnification of less than one to reduce the image to screen size.

This is a very useful feature as drawing components may be created in great detail by simply centring the cursor in the desired drawing area, selecting zoom from the main pop up menu and stipulating the magnification value when prompted.

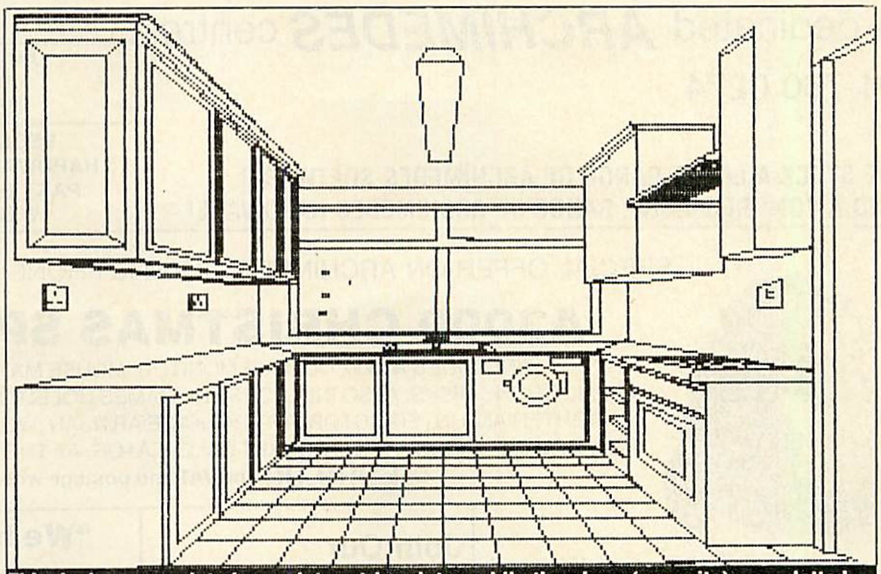
Magnification levels may be set at the start of a drawing if you want but, in fact, the freely accessible zoom facilities actually make this unneccessary.

Another facility permits multi-level drawings to be created. This is a powerful tool. Diagrams such as building plans may be drawn in one level and any alterations or services may be drawn in the other layers (there are eight in total) each of which may be toggled on or off at any time.

Any level or number of levels may be selected for plotting as part of a total drawing or as a single drawing in its own right.

Technomatic's earlier drawing package (*NovaCad*) designed for the BBC model B made extensive use of an icon library system. This proved popular and a similar but more powerful system has been used with *TechnoCad*.

An icon is a diagram which is treated as an individual item within a drawing. This may be anything from a single resistor to



This design was printed on a dot-matrix printer, while the plane (opposite) was plotted

scale drawings of the National Grid! The icon may be a drawing, part of a drawing or a collection of icons. An icon may be rotated, scaled, its line colour may be altered or it may be used to form mirror images. The icon image may also be altered.

An icon is a very useful item as it saves much time and effort with repetitive drawing exercises and whole libraries of drawing components may be stored.

Another interesting feature of *TechnoCad* is that the machine will effectively remember the current drawing even when BREAK is pressed. Memory is maintained through the effective use of sideways Ram. This also means that the machine may be reconfigured for a different plotter or printer without the loss of any data. The drawing will only be lost if the machine is switched off.

TechnoCad comes complete with four printer drivers, with options to determine the number of passes, and six plotter drivers. Printers and plotters are chosen through the initial setup menu simply by moving a highlight bar.

Facilities are available to create user defined drivers for both printer and plotter in the event of an output device not being listed, although this may not be required as many machines are designed to emulate more than one mode.

One of the most exciting aspects of TechnoCad is its ease of use

There are minor points that some users may find irritating. The first is encountered during the initial setup procedure.

If a mistake is made in the selection of a printer or plotter, pressing ESCAPE will not abort the procedure and although no damage can be done to the programe, the slow speed of the BBC Master means that it may be a little frustrating to have to wait until the configure procedure has automatically run its course before running the setup again.

However, this may be easily forgiven when you consider the ability of *TechnoCad* to remember drawing data as outlined above...just press BREAK instead !

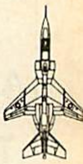
TechnoCad is not provided with a predefined visible grid system. This is not a serious problem as the key, mouse or trackerball step rate can be user defined and so effectively form an invisible grid system.

What's more, the multi-layer drawing facility allows the operator to create a whole variety of grid systems from isometric through orthographic to single, double or triple point perspective and to define each grid as an icon which is easily assigned to a function key.

The grid may also be used as one of the eight drawing levels and may therefore be toggled on or off at the touch of a button. As a drawing level or icon it may be plotted out with the picture, plot out in its own right, or totally ignored.

TechnoCad performed well with first time and experienced users and should have many applications within education, home and small business ventures where possible processing power is limited to a BBC Master 128 machine.

TechnoCad costs £113.85 from Technomatic, 468 Church Lane, London NW9 8TQ. Tel: 01-205 0190



DRAWING CONCLUSIONS

You don't need to be gifted to present all your data in business-like fashion with Presenter 2, the Risc OS graphing package. GRAHAM BELL takes a look

Many of the wordprocessors emerging onto the Archimedes scene allow you to integrate graphics with the text. *Pipedream* is one such, but you can also put pictures on the page with *Acorn DTP*, with *first Word Plus*, and soon with Computer Concepts' *Impression*. *Draw* is great for simple line illustrations, but for repetitive tasks like drawing graphs, a specialist package is a good idea.

Minerva has provided *GraphBox*, reviewed by in November's *BAU*. One competitor is *Presenter 2* from Lingenuity, this is an upgraded, Risc OS version of its original *Presenter*. Both *GraphBox* and *Presenter 2* aim to make it easy to create graphs from tables of numbers – which can be imported from a spreadsheet.

As a Risc OS application, *Presenter* installs itself at the foot of the screen in the usual way. Clicking on the icon opens a window looking like a spreadsheet, into which you can type numbers. The spreadsheet allows up to 26 columns and 55 rows, which should be big enough for the most complex graphing job. You can also add labels for the columns and rows of the table and titles for the graph can be typed into the appropriate boxes.

Although it looks like a spreadsheet, *Presenter* can't do any maths – it leaves this to a real spreadsheet. This means it's important, when you use a spreadsheet to create a CSV (comma separated value) file, to turn formulae into numbers before you export the file – *Presenter* can't deal with the formulae. This is a process called 'pounding', and in *Pipedream*, you can use the Snapshot option to do this.

Once you have a table of numbers, you can edit them, add labels, or add or delete whole columns. Then you create the graph – the menu gives four basic types (bar, line, pie charts and scattergram). Each can be customised using an option dialogue box too – there's good control over the bar size or pie radius and colours, axis scales, whether 3D effects should be added, the shape of blobs used for the scattergram, and so on. A new feature of *Presenter 2* is a line of best fit, useful for scattergrams.

Hitting on the right sort of graph is simple – select a new option and it's drawn straight away. A correct graph can be saved as a *Draw* file in the usual way, or printed out. Importing the file into *Draw* does have the advantage that you can change the size of the whole thing, or alter the fonts used for labels. This is important, as by default, the Corpus (Courier) font is used.

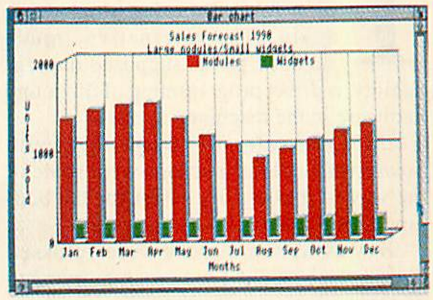
It's unfortunate that *Draw* and *Presenter* are just too large to run together on a 1Mb machine, so you have to save files to disc. An ideal 2Mb allows you to run *Presenter*, *Draw* and a wordprocessor and pull data from one to the other with ease.

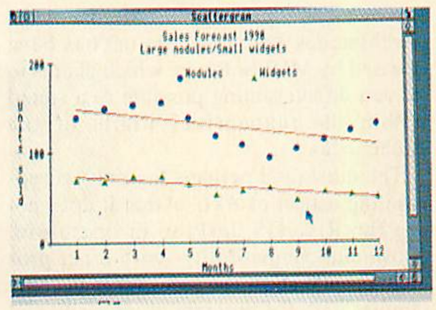
Comparing *Presenter* and *GraphBox* is vital before you buy: they fulfill exactly the same function. What's the score? *GraphBox* has a separate application, *GraphEdit*, to cope with entry of the numbers, whereas *Presenter 2* manages to deal with both tasks, using separate windows for the graph and number table.

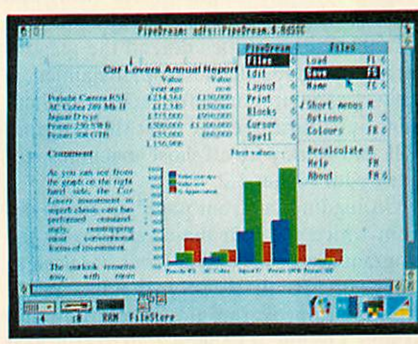
To take a block of numbers from a spreadsheet, say *PipeDream*, you save a CSV file direct into *Presenter*. But with *GraphBox*, you have to use *GraphEdit* as an intermediary if you want to add headings, labels, or alter the axes. *Presenter*'s one-stage process is simpler, and the whole thing seems easier to use.

With Minerva's offering, you can import it into *GraphBox* or *GraphEdit* by dragging the icon – but there's no way to invert the block of data. With *Presenter*, you can easily re-import it the other way up.

The manuals are of a similar standard. *Presenter's* looks better, but both contain an adequate tutorial section as well as in-depth explanations of the menus and graphs.





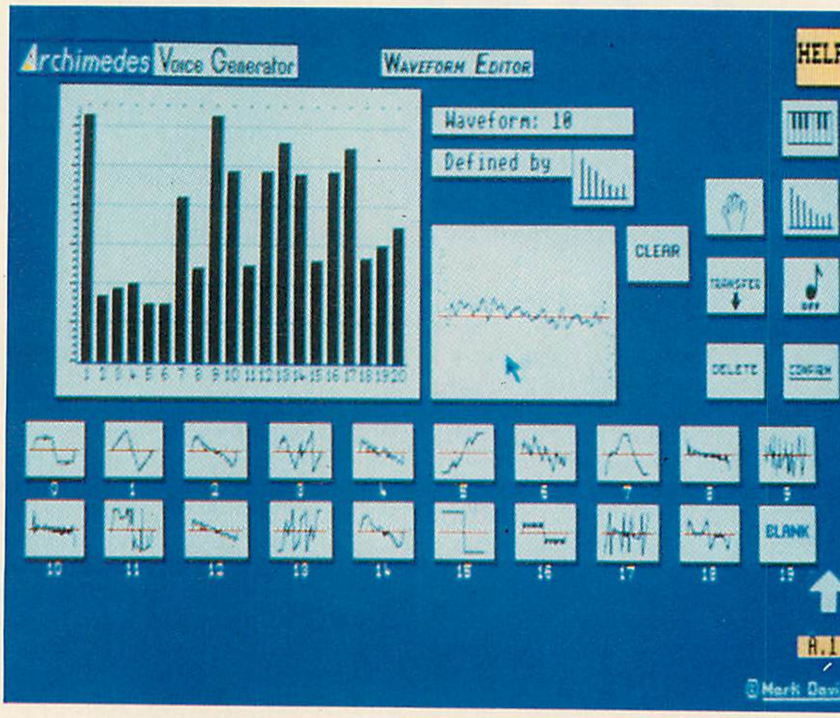


GraphBox can manage an impressive array of graph types, but it's not completely flexible. Something simple like a line graph showing your bank balance for each month is just not possible, although a bar graph is – you would have to number the months rather than name them to get a line graph. *Presenter* excels at simple graph types like this, but can't offer the range of display options of *GraphBox*. My preference is for doing the simple things well – and the laurels go to *Presenter*.

Presenter2 costs *£46 from Lingenuity, Wood Farm, Linstead, Magna, Halesworth, Suffolk IP19 0DU.*



MJD Software claims its voice generator is the best thing since sliced bread and it can do almost everything possible to a sound - within the limits of the Archimedes. Having had a look and a listen for himself, **ROBERT MILLER** is inclined to agree



THE ART OF NOISE

If you thought the only way of getting decent sound from your Archimedes was to fork out £100 plus for a sampler, then think again. The alternative, much shunned for its supposed impregnability, is direct programming of the sound hardware in the machine.

EMR has already tried this with *Soundsynth* and that package went some of the way to making life easier for the budding music student.

However, some areas were 'glossed over', which resulted in a program trying to do too many things at once.

Now, a package called *AVG* (Archimedes Voice Generator) has been released by MJD Software which claims to let you do everything possible to a sound within the (expansive) limits of the Archimedes.

The most (and perhaps the only) disappointing aspect of *AVG* is that it does not use the Risc OS desktop in operation. 'Cosmetic compatibility' with other programs would allow the new user to become familiar with the program more easily and more quickly than the present system.

MJD Software does defend the reasons for not doing so. The desktop, it claimed, is the wrong environment for such an application; but I disagree. At least the program will also work with all those machines still fitted with Arthur 1.2.

On loading, a 'front page' is displayed from which the four main sections of the program can be accessed. Icons are used to represent Realtime Synthesis, Wave Interpolation, Harmonic Enveloping and Sample Editing. A general help page is also accessible at this stage. A nice feature (getting around the lack of Risc OS Help) is an ever-present help system, activated by clicking the right-hand mouse button over the item of interest.

Small one or two sentence messages are displayed where appropriate.

Moving to and from sections of the program is rather like flipping pages in a book. Those familiar with the Apple Mac might recognise the similarity to *Hypercard*, in which a similar system is employed.

Realtime Synthesis

Realtime synthesis creates a waveform and two control envelopes. A selection of sim-

ple waveforms are included with the package and these are best used as a foundation for your own creations. Ready-made amplitude and pitch envelopes are also included.

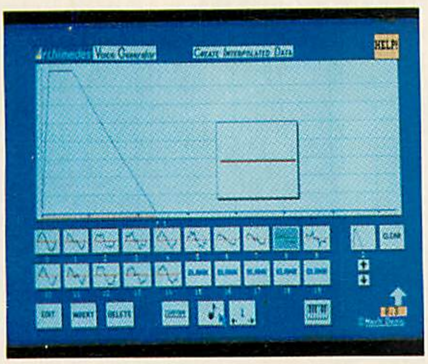
Creating or editing your own waveforms and envelopes is simple. The mouse is used to drag a rubber-banded line around a grid representing the wave area. Peaks and troughs can be added at the click of a button. Likewise, they can just as easily be moved or deleted.

Once the three sections have been created, these can be combined into a sound and saved in the form of a relocatable module. Up to eight (a combination of waveform, amplitude envelope and pitch envelope) are allowed per module. The total number of sounds possible with the supplied waveforms and envelopes is 19x16x15=4560 – so there is plenty to get on with.

Harmonics

An alternative method of creating sounds is by constructing them from harmonics. Harmonics are simply a series of frequencies, each of which is twice that of its predecessor. The first harmonic is known as the fundamental of the note and is taken as the reference point.

A number of waveforms constructed from harmonics are provided as examples. Waves of this type are simple to construct in a similar manner to the 'ordinary' waveforms described above. Waveforms created using harmonics tend to sound softer in comparison to those produced by hand.



Modules

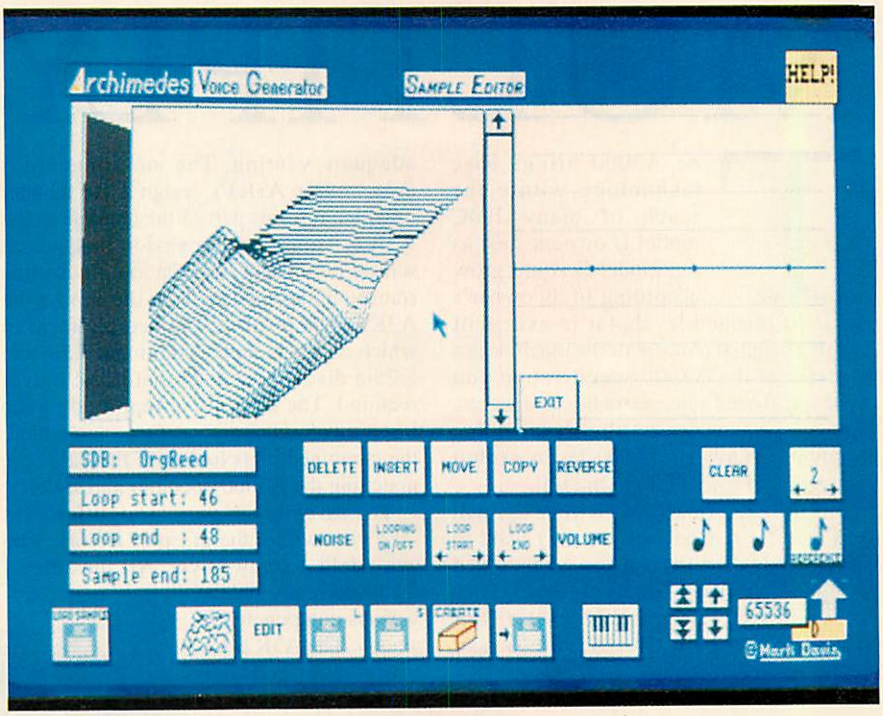
Saved modules can be loaded back into the Arc, independently of *AVG*, and used with the Basic SOUND command or with packages such as *Maestro*.

Interpolation

A waveform, as it stands, is just a single moment in time. In reality, the everyday sounds are made up of a number of waveforms. *AVG* allows you to manipulate these waveforms together to produce these 'more realistic' sounds.

The simplest method of adding waves together is to get the computer to compare the two and then to 'make-up' the bit in between. This is known as interpolation and is the direct sound equivalent of the 'inbetweening' animators use to construct the action between frames.

A good example of a 'natural' interpolation effect is an electric guitar fitted with a distortion pedal. When the musician first plucks a string, a 'pure' note is heard. This soon transforms into a distorted noise. The interpolation is the transformation of the one sound to the other. Interpolation is supported by *AVG* and is carried out using a combination of 'on-screen' icons and mouse control as above.



More harmonics

A more accurate means of constructing waveforms with harmonics can be achieved using the separate Harmonic Editor. A number of sound waves (maximum of eight) can be designed and then 'merged' together. The original waveforms are kept and these can be edited to change the finished sound.

A complete explanation of its operation would be complex in the extreme but suffice it to say it maintains the ease of use whilst remaining as comprehensive as the rest of the package.

A complete description was also omitted from the provisional manual supplied with the review package but it will be present in an advanced supplement manual to be provided with *AVG*.

Samples

The final part of *AVG* is the Sample Editor. This allows editing of Sound Data Blocks or of samples acquired using any of the 8-bit podules available. No provision is made in the software to sample sound so you will need separate software to do that.

The Editor allows, amongst other features, the cut and paste of sections. Whole samples can be viewed either as three dimensional graphs or as separate waveforms. The mouse is used to select points in the sample in both cases. Loop points can be inserted to allow section(s) to be repeated. The repeated section can be made to play until the relevant key is depressed.

Once samples are in a satisfactory state, they can be saved as modules. As for voices, there can be up to eight samples per module. A special facility allows copies of the same sample, set to different pitches, to be saved in a single module.

These 'multi-layered' modules make the emulation of instruments that use a wide frequency range much simpler, such as a piano, for example.

A sound investment?

To sum up, *AVG* provides an extensive range of tools with which to construct and manipulate sounds. The package is really aimed at the serious and professional user and the constant use of sound jargon in the manual reflects this.

At first, the price seems steep for what initially appears 'just another' sound package. After extensive use, though, I can confirm that this is a small price to pay for such a detailed piece of software.

The Archimedes Voice Generator costs £49.95 from MJD Software, 13 Burnham Way, London W13 9YE. Tel: 01-567 4284.

All manner of bits and pieces can now be bolted on to your new A3000 as **CHRIS DRAGE** has discovered

ADD-ONS MULTIPLY

The A3000 brings Risc technology within the reach of many BBC model B owners. Just as the model B could grow according to its owner's needs (it reached levels far in excess of Acorn's original concept of the machine) so to arrive at the A3000 specification you want you'll need some extra bits and pieces.

Several companies are already providing a growing number of upgrades to exploit this aspect of the A3000 to the full.

Probably the first item on your list will be a monitor plinth, then you may want to add a second disc drive. If you are involved in education, that is likely to be a 5.25in drive and you will probably want a DFS interface to enable your A3000 to read model B, DFS software.

Other needs are likely to include a hard disc unit, a user port and 1MHz bus, a podule box to take expansion cards for scanners, digitisers, SCSI devices and the like.

However, first on the list must be a plinth to support the monitor. It is not wise to try and rest a monitor on the A3000 case.

Of the two currently available, the A3K1 free standing monitor plinth from Pres is highly suitable. Made from heavy gauge steel, it quite happily withstands my 75kg frame on top of it.

The Pres plinth cleverly overcomes the problem of the location of the reset button below the side entry disc drive. The A3K1 partially covers the button so the computer must be deliberately tilted to execute a reset – a welcome feature for schools in particular. However, the power switch and disc drive both enjoy clear access.

The A3K1 has a solid base plate on which the computer sits which, in turn, can be screwed to a desk. The monitor base of the A3K1 encloses the top of the computer where it covers all those ventilation slots so inviting to spilt coffee. However, there is a sufficient gap left to permit adequate venting. The most ingenious aspect of the A3K1's design is the manner in which it forms part of the upgrade to the A3K2. This is an expansion box which screws onto the A3K1, the top of which is removed and replaced on the top of the A3K2. The result is a raised platform in which can be mounted additional 3.5in and 5.25in disc drives and a hard disc unit if required. The structure is kept rigid by the insertion of a central strut. Once assembled, the combined units look as if they are one, matching the A3000 in colour and style.

The assembly is very straightforward and well within the grasp of anyone who can wield a screwdriver. All the screws locate correctly and the various components fit snugly. The A3K2 provides the required power supply for all three additional drives and the front bezel of the unit has removable panels to take combinations of floppy drive sizes – one 5.25in and one 3.5in or two 3.5in drives.

The A3K2 also has a cooling fan and exhaust vent at opposite sides. The fan is slightly noisier than you would expect as it tends to reverberate in the empty space. However, it is considerably quieter than the DA Computers unit I'll be coming to in a moment.

The review model was fitted with a 20Mb hard disc with a single warning light mounted on the front of the A3K2. This glows green for 'power-on' and turns red when the disc is being accessed.

The unit is made in the same gauge of steel as the A3K1 and the combination could take my weight without strain so a Taxan 770 Plus is no challenge whatsoever!

My only real criticism is the lack of a power switch. As it stands, you must unplug the A3K2 from the mains socket at the end of a session.

However, together the A3K1 and A3K2 provide a rugged enclosure for your expensive disc drives negating the need for all those boxes and spaghetti which tended to plague the model B.

The next stage in Pres's upgrade path is the A3K3, a small metal case specifically designed to house mini expansion cards. The case locates on and bolts to the back of the A3000 to ensure a safe and sturdy environment for the cards. The A3K3 can 'expand' to take up to four mini cards.

Pres has opted for mini expansion cards as full or even half sized podules are simply too bulky to be safely 'hung' on the back.



Combined Pres add-ons match the A3000 in both colour and style

Also by designing their own cards, Pres can guarantee they will work externally!

The company has a number of mini cards under development, including a DFS Controller, user port/1MHz bus, analogue port, Rom/Ram board, SCSI and MIDI. The review unit contained a hard disc controller for a 20Mb drive in the A3K2.

As it stands, the A3000 cannot cope with 'normal' Archimedes cards because, unlike the A300/400 series, the A3000 does not provide the required power outlets. However, Pres will release the specification for the mini cards to any third party wishing to take advantage of the expansion opportunities offered by the A3K3 unit.

Fitting the case was a little fiddly as it is important to make sure the pins line up correctly before tightening the screws.

To ensure security, the lid of the A3K3 is cunningly cut out to partially cover the screws, making their removal impossible unless the lid is removed first. The A3K3 is designed to expand upwards (A3K4 podule expansion) as you add more cards. Being so small, the expansion box sits right under the A3K1 plinth out of sight and out of reach of prying fingers!

In common with the A3K1 and A3K2, the A3K3 is compact, neat and soundly constructed and is absolutely ideal for a classroom environment.

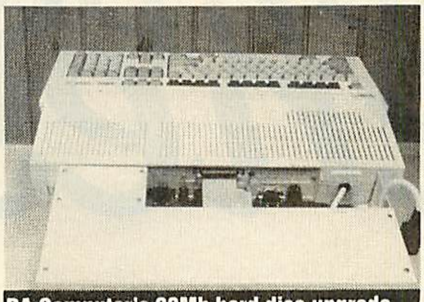
The only negative point about all this expansion is the weight but that will prove a problem only if you intend humping your A3000 about. To disconnect everything is inconvenient and undesirable – you must flex your muscles!

On the other hand, Pres's range of add-ons offers tremendous advantages. The system can grow with your pocket, it offers security and strength but most importantly it offers choice. For example, adding a hard disc does not penalise the use of the one-and-only expansion port. As you read this, Pres will have completed the 1770 DFS disc controller (A3K6) which will be an internal mini card.

Taking the possibilities to the extreme, you can have your second 3.5in drive, hard disc, three more expansion cards and a 5.25in drive running your existing 8-bit software under Risc DFS – all neatly tucked up and free from multitudes of cables and boxes – nothing short of a Risc OS Beeb.

A second disc drive certainly makes some of the larger, multi-disc applications like Acorn's *DTP* more efficient and in general permits easier disc management all round. If you choose a 5.25in drive, you can also gain access to a vast amount of MS-Dos software via the PC Emulator.

Two disc interfaces are currently available for the A3000. As each is correctly buffered, it will permit a second 3.5in or 5.25in drive to be connected and operated without risk to the disc controller chips on



DA Computer's 20Mb hard disc upgrade

the main board.

CJE Micro's interface fits the A3000 although its drive connector sits rather untidily between the lid and the rear casing. This interface is quite easy to fit and proves very efficient and reliable in use. CJE's interface also works happily in a 300 or 400 series Archimedes.

DA Computers also produces a well constructed, buffered interface, specifically designed for the A3000. It fits into the internal, mini card slot and is extremely neat and tidy. A firmly mounted switch enables the external drive to be selected as drive 0: (or A: with the PC Emulator). With its two year warranty, this upgrade can be thoroughly recommended. However, be prepared to lose your internal slot.

There is no doubt that one of the most popular upgrades for the A3000 will be the hard disc. For DTP work, running MS-Dos software under the PC Emulator or any application which entails a great deal of disc access, a hard disc is an essential item.

One route to achieving this is with Pres's upgrades but you may not wish to go any further than a hard drive, in which case you would be well advised to consider the sensibly designed 20Mb hard disc upgrade from DA Computers. This module bolts onto the back of the computer to produce a rigid extension which can even support a multisync monitor!

The controller card and hard drive are self contained within the case, sharing the space with a power supply and a fan unit. The module also contains a power distribution system providing two additional, ('Euro' type) power sockets on the left-hand side for the computer and monitor.

The ability to handle a screwdriver, exercise some common sense and have a spare five minutes is all that's needed

This is ideal as far as the monitor is concerned but replacing the mains plug on your A3000 will technically invalidate the guarantee. However, with only one power lead to deal with, the reduction in 'spaghetti' is most welcome.

A single (fused) switch controls the mains power to the whole system. Fitting the unit to the rear of the A3000 requires few special skills.

Like the A3K3, the DA Computers unit bolts onto the expansion port but also uses the A3000's left, securing screw. Like the Pres unit, the lid of the expansion box hides the screws providing security.

The result is very sturdy without adding much additional weight or bulk to the computer. In practice you can treat the A3000 and the hard disc as one unit. The expansion box has feet raising it sufficiently to enable cables to pass underneath. Similarly the unit clears the plugs bolted onto the rear of the computer.

The advantage over other systems is that the computer and hard disc become a single, rigid unit – an important attribute for use in a classroom environment.

The hard disc is supplied formatted and contains the HFORM program in its root directory. This should be copied to a floppy disc for added security. Once connected, all that remains is to configure the computer to recognise the new drive and install its icon on the icon bar.

The only disadvantage with this system is that it ties up the external expansion port, denying you use of expansion cards. However, the internal one is free for the Acorn user port and MIDI card which, when combined with the CJE Micros disc interface, provides a degree of versatility.

Pres, CJE Micros and DA Computers offer A3000 owners routes outward and upward. They each offer quality products at sensible prices. Already the choices available are expanding rapidly and it will not be long before the A3000 matches its humble 8-bit predecessor in a plethora of expansion options.

The A3K1 plinth (£28.69), A3K2 system housing (£79.92) and A3K3 podule case (£17.19) are available from Pres, PO Box 319, Lightwater, Surrey GU18 5PW. Tel: (0276) 72046. The A3000 20Mb hard disc expansion unit and external disc interface cost £573.85 and £34.50 respectively from DA Computers, 105 London Road, Leicester LE2 0PF. Tel: (0533) 549407. The external drive interface costs £34.50 (plus £9.20 for the drive switch) from CJE Micros, 78 Brighton Road, Worthing, West Sussex BN11 2EN. Tel: (0903) 213361.

Genesis

Hypermedia for Archimedes!

Genesis provides a framework for creating and accessing linked pages of information. Many types of data can be displayed on Genesis pages including:

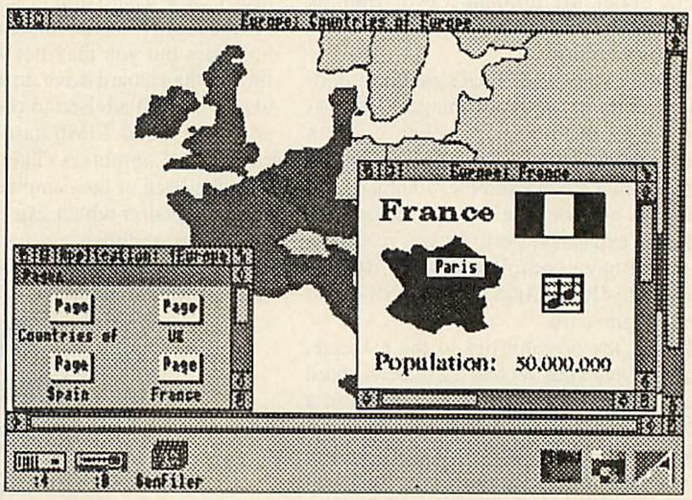
- text in many fonts, sizes and colours
- sprites from painting packages or digitizers
- object oriented graphics from Draw, Presenter 2 and other packages
- 3D pictures from Euclid which can be viewed from any position
- animated films from Mogul
- music from Maestro, including support for MIDI

NB Genesis does NOT need Euclid, Mogul or Maestro to be running in order to display their data

Genesis can be used for creating information resources which can be updated as appropriate.

Genesis supports many of the requirements of the National Curriculum for retrieving, developing and organising previously stored information as well as amending and adding to this information.

Genesis provides an ideal tool for creating reports and presentations with hard copy available via the standard RISC OS printer drivers.



Genesis is £99.99 inc VAT and will be available at BETT'90 in January 1990

SOFTWARE SOLUTIONS

Broadway House, 149-151 St Neots Road
Hardwick, Cambridge CB3 7QJ
0954 211760 Telecom Gold 74: YKK255

ROGER HOWARTH tries Aleph One's replacement Arm3 processor for Arcs

FAST WORK

The Arm2 (Acorn Risc Machine 2) processor inside all Arcs and the A3000 was designed by Acorn but manufactured by VLSI. As part of the agreement between the companies, VLSI is allowed to sell this chip on the open market.

Having completed Arm2, Acorn continued development of the design which resulted in a new version, called the VL860020 or Arm3. This new chip improves on Arm2 with extra support for co-processor and multi-processor installations and features a 4K on-chip data and instruction cache.

Although Arm2 is capable of running at a clock speed of 20MHz, it's always been run at 8MHz because of its dependence on the Archimedes data bus and the relatively slow Ram chips.

The Arm3 cache reduces the processor's dependency on the data bus and so the clock speed can be increased to 20MHz. None of these changes affect compatibility with existing Arm2 software or support chips, with the exception that in early Archimedes models without the '/1' suffix, the MEMC1a upgrade kit must be fitted.

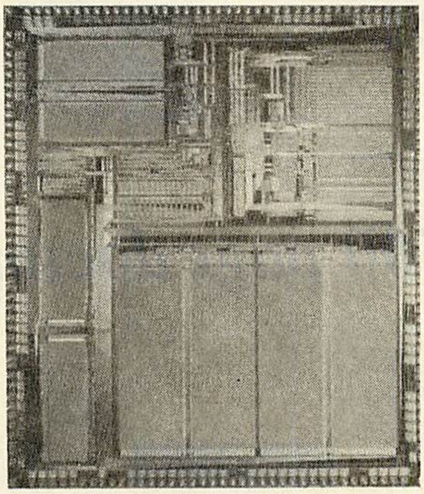
With all these extra facilities the two chips are not pin compatible, so upgrading is not as simple as plugging in an Arm3. Instead, this new chip, together with some supporting hardware, is produced on a small board which plugs into the Arm2 socket. The upgrade requires only about 10 minutes, a few screwdrivers, two chip extractors and a basic knowledge of Archimedes anatomy. Aleph One offers a free fitting service for the faint-hearted.

In use

The Arm3 package includes a program that switches the processor between two modes of operation: there's an Arm2 compatible 'slow' mode, where it runs at 8MHz with its cache disabled, and a fast mode with the cache and 20MHz clock in operation. Switching between modes is performed by clicking on an icon on the Risc OS icon bar at any time – in slow mode, the icon is a tortoise and in fast mode, a hare!

Once installed, Arm3 looks after itself. There are no other controls to worry about. Aleph One claims the device is 100 percent compatible with all software and hardware but this is a little dangerous. A few programs operate too quickly. For example, some sound samplers and games become difficult or unsatisfactory to use with Arm3.

More seriously, the floating point coprocessor is incompatible because to communicate in Arm3's cached environment, the co-processor must link with Arm3's new co-processor interface rather than the standard data bus. This last problem should be fixed by early 1990.



Test	Arm2	Arm2 +MEMC1a	Benefit (%)	Arm3 +MEMC1a	Benefit (%)
Compile "Sieve"	4.3	4.26	0.9	3.29	30
Run "Sieve"	6.68	6.59	1.3	2.95	126
Compile "Dhry2"	15.50	15.33	1.1	9.09	70.5
Run "Dhry2"	44.82	44.27	1.2	16.83	166.3
Dhrystones/sec	4551	4583	0.7	12099	165.8
Screen scroll		10.14		7.39	37.2
Average benefit			1.04		99.3

All tests used an Arc 440 in mode 12

The compile tests used example programs supplied with Acorn's Ansi C Release 3. The Dhrystone test was timed for 200,000 iterations.

The screen scroll test was the time taken to scroll a First Word Plus window, character by character, horizontally left to right.

However, the number of applications that use floating point arithmetic is small. The chances are, unless you use either Fortran or some versions of *!Draw*, you won't use FP maths at all. To check whether your programs use FP maths, type RMEnsure FPEmulator 2 from the star prompt at the end of a typical day's work. If the system responds by telling you there is no FP emulator installed, you don't use one!

Floating point maths aside, Arm3 brings a spark of life to the Archimedes. Its effect is noticeable in virtually every application, speeding up scrolling and making everyday programs such as Basic, compilers and wordprocessors respond much quicker.

This is of most use with processor intensive applications such as language compilers, DTP and data manipulation such as Fast Fourier Transform algorithms.

Performance

The accompanying table confirms that Arm3 had the most drastic effect on the execution of processor tasks such as the Dhrystone and sieve benchmarks. These programs spend none of their time waiting for input from disc or user and utilise negligible screen output. Its effect on programs that rely more heavily on I/O functions such as disc accesses (compiler) or the screen accesses (scrolling text) are less dramatic.

However, the percentage speed increases indicate a worst case of 30 percent improvement, and on average, execution times were halved.

All the tests were run in mode 12. Different screen modes produce different run times from identical programs – the higher resolution the screen, the slower a program will run. This is because higher screen modes use more memory so the data bus is occupied more often moving screen data around and is available less often for use by the processor.

This problem is complicated as Arm3 is less reliant on bus availability than Arm2 because its cache will usually contain the necessary data. In fact, the Arm3 normally requires only a quarter to half the bus 'bandwidth' and so Arm3 computers show a higher percentage increase in execution times as the screen resolution increases.

This makes Arm3 more attractive if you use the higher resolution screen modes required by art and DTP programs.

Conclusion

The Arm3 will certainly spruce up the performance of your Arc. The average figure shows almost 100 percent increase, which is fair, while specific tasks can realise even greater benefits.

The future also looks exciting. Acorn certainly didn't develop the Arm3 for the benefit of Aleph One. It's only a matter of time before Acorn announces new products using this chip. Arm3 is also stimulating for programmers to work with, providing even greater scope for runtime improvements if programs are optimised using sub-routines and small loops rather than repeated instructions – both these techniques increase cache efficiency.

The bottom line with products like this is invariably the same. Time is money. You value your time, you buy the product.

Arm3 costs £684.24 and the MEMC1a £57.50 from Aleph One, The Old Court House, Bottisham, Cambridge CB5 9BA. Tel: (0223) 811679.

Q. Which program can produce these...

COMPUTER CONCEPTS PRESENTS

A better word processor

One solution for your word processing AND desk-top-publishing requirements.

Supplied with the new outline font manager†, Impression is capable of producing outstanding quality prints on everything from dot-matrix printers to typesetting machines.

The first word processor designed for RISC OS - it multi-tasks with other applications and supports direct, in-memory data transfer to and from other RISC OS applications. For example to import a diagram from Draw, you can simply drop its file icon onto an Impression frame - the diagram is then immediately transferred to Impression. The same applies to !Edit and !Paint and other RISCOS applications.

Impression is a fast and compact program and so is ideally suited to a 1MByte machine. It is extraordinarily powerful - able to handle ALL documentation needs from simple one sided letters to the most complex magazine layout. Unlike traditional DTP systems, Impression is not only capable of handling long documents, but does so with ease. Yet it is not a complex program to use - considerable attention has been paid to making Impression simple to learn and easy to use.

The creators of Impression come from a background of word processor design that includes some of the most successful word processors ever produced. They are also the originators of the most advanced application programs for the BBC micro and the authors of the best selling word processors for this machine over a period of 8 years.

† Fonts licensed from Acorn Computers

IMPRESSION

The Word Wise

This is a frame based word processor. All text and graphics occur within rectangular frames, which may be positioned anywhere on the page and be any size up to the full page. Frames may be re-sized and re-positioned at any time just by moving the mouse pointer to the frame and dragging. Frames can be thought of as two dimensional rulers controlling not only the left and right but also the top and bottom margins of the text.

Text can be made to flow from one frame to any other on the page, or on other pages - this happens automatically as frames are re-sized or the text is edited or altered. In this way text may be formatted to multiple columns or indeed into multiple sections at any position on the page.

Impression provides total support for frame manipulation. Options include a variety of border types - to liven up the page, or to put a box around some text etc. Frames may be displayed transparent (objects can be seen under the frame) or with any colour background. One other special feature of frames is the text repel option. This forces text to flow around certain frames (containing graphics for example). Unusually Impression allows (if required) text to flow around BOTH sides of a graphic frame, rather than the more conventional approach that normally restricts text to flowing to ONE side of the graphic.

Automatic re-formatting, re-pagination and text flow

Impression keeps the current document totally up to date so that it always exactly mirrors the final printed output. Text is continually, automatically re-formatted as it is edited or altered. There is never a need to issue re-format commands or select re-pagination menu options as is the case with many other word processors. Unlike other DTP systems Impression also allows the text and the cursor to flow from frame to frame and from one page to the next unhindered. For users this means that they can simply type and continue to do so without any regard for frame order or for page breaks etc. Impression copes with it all.

Graphics

Word processors that cannot include graphics on the page are severely restricted and word processors that do support graphics are usually limited to the placing of a simple sprite on the page which cannot be altered.

The Facts

- *Multiple windows on any document.*
- *Multiple documents in memory at once*
- *Spell-Master spelling checker included*
- *Totally integrates with RISC OS*
- *Scale the view by any percentage amount*
- *Scaled print - by any percentage amount*
- *Rotated print (e.g to fit 2 A5 pages on A4)*
- *Graphics aspect ratio lock (to any value)*
- *Graphics scale and crop*
- *Fast character mode printing*
- *All controlled by only 5 main menus*
- *A specially designed Greek font included*
- *InterWord & First Word® loaders*
- *Full European character set*

Page 1

IMPRESSION

The Archimedes document processor

Spelling checker

Impression is supplied with the Spell-Master interactive spelling checker. This supports a 60,000 word English dictionary, check as you type, dictionary browse, user dictionaries, ignore dictionaries etc. This also has a highly intelligent "guess" word facility. If you misspell a word, or simply mistype it, the computer will bleep. By pressing one key a small window is displayed listing words that it thought you meant to type; clicking on the appropriate word will then replace the incorrect one in the text (and any other occurrences of the word). In practice this usually lists only one or two words and has achieved in tests a success rate of over 90% in guessing the one correct word straightaway.

Abbreviations

Impression allows the user to keep a list of words or phrases and their abbreviations, and will expand any typed abbreviations to the full text. So, for example, you could type 'CC' and get Impression to automatically change this to 'Computer Concepts' - as you type.

Hyphenation

In addition to abbreviation expansion, Impression automatically hyphenates words as you type using some advanced word splitting algorithms. This is particularly important for printing multi-column documents. A hyphenation exception dictionary is provided allowing precise control over the hyphenation points of any specified word.

Character Mode

Impression can be used as a straight forward word processor and in addition to the RISC OS printer drivers (licenced from Acorn) a set of character mode printer drivers are included allowing Impression to drive printers using their built-in character sets. It therefore offers the best of both worlds - high precision, high quality DTP-like prints or fast, traditional, character based word processing.

Automated index generation

Any word or phrase may be selected to appear in the index and by selecting one menu option an index is created at the end of the document listing all references, by page number, to these words or phrases.

Measurements

Impression can display or accept measurements in a large variety of situations. For example, the frame size and position, ruler measurements, text size, line spacing etc, etc. In all cases Impression can display or allow the user to enter these measurements in a variety of unit

...and handle a 500 page document with ease...

Scan-Light



Twiggy in the 60's

Scan-Light

The Archimedes image scanner.

The above images were 'grabbed' using the Scan-Light 200 dpi scanner. Although this is only a monochrome scanner, a special software anti-aliasing feature can convert any monochrome scan to a 16 grey level image. Such grey-level images are ideal for incorporation into DTP products since they can be scaled to any required size without suffering from any patterning effects that usually afflicts less capable scanning software.

This document is created, edited and printed from Impression, the new document processor.

This entire page was produced on a 1200 dpi typesetter, direct from Impression

IMPRESSION

THE DOCUMENT PROCESSOR FOR THE ARCHIMEDES
A BETTER WORD PROCESSOR

The Archimedes is a very powerful computer and Impression makes full use of this power. This doesn't just mean that Impression provides more facilities but that, in addition, the conventional word processing features are implemented in a faster, more natural, more fluent way than was ever possible before.

This is a completely new design for a word processor. It may contain influences from other products on other machines, but it is not a conversion from a product designed for other machines. It has been created from scratch to be as advanced, as flexible, as adaptable and still as simple to use as any product, on any machine.

Impression is more than a word processor, it can handle complete documents ranging from whole books, newsletters, or technical articles, to single page advertisements. It can handle all aspects of the final printed result - the text, line graphics, photographs, company logos etc. Yet it can still be used to bash out a single page of text as well as any 'simple' word processor. It is a document processor.

The creators of Impression come from a background of word processor design that includes some of the most successful word processors ever produced. They are also the originators of the most advanced application programs for the BBC micro and the authors of the best selling word processors for this machine over a period of eight years.

Programmers

Computer Concepts is looking for programmers to join the team at Gaddesden Place to assist in the development of a range of new hardware and software projects.

Knowledge of assembly language programming (any processor) is necessary and, although not vital, it would be an advantage to have some experience of Acorn machines.

We can offer a friendly working environment with your own office in Gaddesden Place and the use of the facilities of this historic building - snooker, tennis, croquet, all in a country setting half an hour from London. We can even assist with local accommodation.

For any further details contact Catharine Moir at:

Computer Concepts Ltd

Gaddesden Place, Hemel Hempstead, Herts. HP2 6EX
Tel (0442) 63933. Fax (0442) 231632

...on a 1MByte machine?

A. IMPRESSION

Computer Concepts Ltd

Gaddesden Place, Hemel Hempstead, Herts. HP2 6EX Tel (0442) 63933



WIN

A COMPLETE DTP SYSTEM

This is the last part of our exclusive competition for one lucky *BBC Acorn User* reader to win over £3000 worth of DTP gear kindly donated by Acorn and Panasonic.

A complete DTP system is on offer:

- Acorn BBC A3000 32-bit Risc computer
- Mb Ram expansion
- Acorn colour monitor
- Acorn DTP software
- Panasonic KX-P4450R 11PPM Laserjet compatible laser printer

In the December issue we published six questions on print and publishing along with a coupon, and last month there was another coupon and three more questions on lasers and laser printers. Now here are the final questions and coupon.

When you have answered these, dig out your coupons saved from the last two issues and check over your answers to the previous questions. You then have until the January 31 1990 to send in all your answers along with the three coupons.

Seal all three coupons inside an envelope and on the back write what you think correct answer for each question is next to the question number.

Also write your own name and address on the back of the envelope and state which micro (BBC B/B+, Master 128, Master Compact, Archimedes or BBC A3000) you currently own.

The first correct entry out of the editorial hat after the closing date will be the lucky winner of the complete system.

This competition is open to all readers of *BBC Acorn User* resident in the UK excepting employees of Redwood Publishing, Acorn Computers and Panasonic. The judges' decision on all matters concerning this competition is final and no correspondence will be entered into.

THE LAST QUESTIONS

10. Name the two most common laser printer control standards.
11. How big is a 'pica em'?
12. The Acorn DTP software is derived from which other commercial program?

BBC ACORN USER

3

DTP COMPETITION COUPON No 3

GAME SHOW

I could start with 'Happy new year', 'Happy new decade' or 'Mark Botterill declares war on *Zarch*'. I think I'll go with the last item.

Mark has described the graphics in *Zarch* as 'poxy', and The Fourth Dimension is aiming higher. Armed with a brand-new three-dimensional plotting technique, Mark is talking about a game described as a helicopter simulator.

Imagine *Zarch* with floor tiles too small to be recognised as such and a landscape that stretches to infinity instead of 10 feet away from the craft. The routine will be employed in many of 4D's later releases and Mark went on to say 4D 'would put the releases of 1989 in the shadows'.

Superior is entering the 1990s with a stronger grip on the Archimedes market. Steve Hanson told me 90% of its games will be for the BBC micro and Electron and the remaining 10% for the Arc.

One of the latest releases is *The Last Ninja II* and this marks Superior Software's 100th title. I'm told there are 100 more to come! There should be three or four new Arc games in the first quarter of 1990.

A Risc version of *Superior Soccer* has been rewritten by Peter Scott, incorporating all the features he couldn't put in the Beeb one for lack of room. It'll be interesting to see how it fares alongside *Manchester United Football Club* from Krisalis software, due at the same time.

Also, a game called *Caverns* is on the way from Repton creator Tim Tyler. It's an arcade adventure similar in style to *Exile*. Another arcade adventure (yawn) called *Rubicon* is expected soon from Matthew Atkinson, author of *UIM*. On the 8-bit side, a conversion of *Captain Blood*, the 3D space game for the Atari ST, will also be available soon.



A J Capel from Westbury-on-Trym in Bristol has sent in the passwords for Minerva's *Ibix the Viking*. They are, in order: Subjunctive, Dictionary, Consequence, Interpreted, Development, Etiquette, Information, and Scthurairst.

I Packer from Tewkesbury in Gloucestershire has sent in a method for getting the Icer in Superior's *Exile*. It is to be found on a ledge between the two teleport machines above the pink chest near the main cavern. Go to the left teleport and shoot it off the ledge, then fly round to the right-hand one and shoot it into the left.

Then fly back round and (having pressed R) teleport yourself to the same location.

Barnes Cook from California has requested help in the activation of the 'Chatter' robot in *Exile*. Well, he is situated in one of the 'modern' looking rooms just on the right of the main cavern. To get him moving, it is necessary to throw coronium rock in his mouth. This is obtained by collecting the blue mushrooms, taking them to a fire to convert them into chunks of coronium rock (which you must store quickly to avoid being contaminated – unless you have the anti-radiation pill).

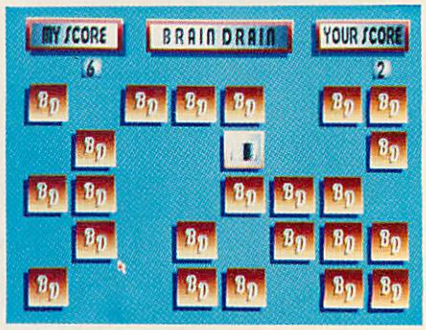
Once fed, he finally needs to be whistled at with a special whistle. One can be found half way down the windy shaft along the path leading to the left, where you will have to wait for blue monkeys to open the doors. The other is in the room facing the right-hand side of the main cavern. To get this one, you have to first disarm the unsociable turret by either killing it or turning it off.

Once disabled, you will need the help of 'Fluffy' to get the whistle out. Fluffy lives in the top right-hand part of the area just to the top right of the windy shaft. He is attracted to you – don't be a hero by running through the mushrooms for him.

Once you've energised Chatter, he will follow you around, zap baddies with a nifty little ray gun and best of all, swap coronium rocks for power pods.

Finally, anyone withholding built-in cheats, pokes or games news of any sort should send them in to The Game Show.

Sam Greenhill



FAMILY FAVOURITES

Minerva Tel: (0392) 437756
Archimedes £19.95

The title hints at the old 'hours of fun for all the family' advertising theme. Fun yes, but hours no. As for 'all the family', the adults will find it all a laborious strain on their poor minds.

Family Favourites contains three games which amount to pelmanism, a variation of draughts and Light Cycles.

The pelmanism clone is a memory game and presents a set of face-down cards. Turn two at a time to reveal the design and if they pair you keep them and score a point. If they don't, they are turned back and the computer tries again. Now we all know that no computer is going to play fairly at a memory game and the programmers have over-compensated for this inevitable criticism by handicapping the poor machine.

As it stands I can thrash it 18-2. The graphics are nice but there are a few bugs in the sound department.

The Light Cycles look-alike 'Dead End' involves two constantly extending lines, the tips of which are directed by yourself and the computer. As the line draws itself you must ensure it doesn't touch anything else.

The computer controls its line like a suicidal maniac, so the best strategy is to hang about drawing boxes until it walks into its own trap. Fun for a while.

The last game, called Gridlock, has you capturing counters from the computer's line by placing two of yours at either end. This is the most strategic of the three games but still doesn't hold water for long.

SHOW

A heinous omission in all three games is that of a two player option. The only way 'the family' can play is as a team, provoking no competition.

Children of around seven-14 will no doubt find this game enjoyable but I warn you, charm runs out too soon – not substantial enough to merit an investment of £20.

Sam Greenhill

ARMATRON

Z&Z Software
Archimedes £8.95

The name is new but the software house isn't. Z&Z was responsible for the Arc's first shoot-em-up, *Quazer,* and has now followed it up with the more strategy based *Armatron.*

It's little more than an arcade adventure. You control a space ship through an underground maze complex structured as a grid of adjoining caves which contain nasties such as floating hamburgers.

You must defuse time bombs and collect gold tokens. These can be exchanged for enhanced weaponry and shields. There are forcefields which can be removed by switches and turrets which fire periodically. If a cave contains a time bomb, you must get to it and touch it before the time runs out. Then a second countdown begins while you crack an 8-digit code to receive a bundle of tokens, or fail and die. This part should appeal to professional safe-crackers.

The graphics are pretty mediocre and the sounds aren't even sampled from a real space ship! It is often difficult to tell a nasty from an artistic background.

The game play is quite fun. I quite enjoyed flying around bombing, laying mines and finding new passages. Ultimately you must find the alien responsible for the mess of time bombs. At this juncture you can decide whether you enjoyed his creation or not before shooting him in the belly and escaping pronto.

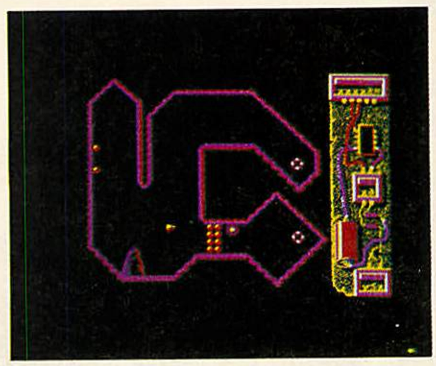
As the game develops, so do the puzzles, making *Armatron* more challenging than some of games aimed at the younger generation. However, it must be said *Armatron* in no apparent way exploits the features of the Arc and it could have easily appeared on the Beeb. Still, BBC games can be enjoyable and *Armatron* can be considered as such. While not whisking anyone off their feet, the asking price of £8.95 is certainly reasonable for what it is.

Sam Greenhill



BLAST

Audiogenic Tel: 01-861 1166
BBC/Electron cassette £9.95, BBC disc £12.95



Blast is a simple game. The action is set in a group of large underground caverns, each enclosed by a rocky wall.

You are in control of the latest two-colour pear-shaped space rocket which can move and fire at the same time.

Anyway, shoot the flashing circles, take out the limpet guns, 'blast' through walls of spheres and...er, that's it.

Although it is simple, it is addictive and to me this counts more than the fact the graphics are bad and the sound added for reason of necessity and not for creativity.

The idea is to fly around not hitting anything and shoot everything before moving to the next screen. The space ship pretends to obey the laws of physics but does not and this actually makes it quite good fun.

There is nothing new or exciting about *Blast*, it's just one of those games people buy, play and then forget. I didn't buy it but I've played it and though I haven't forgotten it yet, I have doubts as to whether I will be able to remember it next month.

Sam Greenhill

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ACORN USER ADVERTISEMENT PAGES – FEBRUARY 1990



DOCTOR ON CALL

Healthdata brings preventative medicine to all. **PAULINE MCLERNON** phones Chris Dobbing



In 1985, Dr Chris Dobbing was an East End GP. He knew nothing of computers, modems, networks and the like. Now, five years on, Chris Dobbing is still an East End GP, but he is also running a nationwide on-line health database running on a network of Acorn computers – in his garage.

So, what happened? 'In 1985, some databases were being used in medical circles. Although I knew nothing about computers at the time, I thought this would be a good way of getting health issues and information to the general public' says Chris. 'So I determined to learn'.

And learn he did. A BBC micro was bought and Chris got to grips with *View* while making readable English out of the over-technical medical journals.

His next purchases were a modem and a copy of the *CommunItel* package. 'I looked at Prestel but it was too expensive' he says, 'and using *CommunItel* meant users would only be charged the cost of the phone call'.

Soon Chris had acquired all the necessary equipment and by the end of May 1985, *Healthdata* was up and running. The whole system cost just under £1000.

The database covers all aspects of health, written in an accessible way. There are sections on drugs (including cigarettes and alcohol), Aids, sex and contraception, radiation – in fact, it's a real life 'everything you ever wanted to know but were afraid to ask'.

'I'm a great believer in preventative rather than prescriptive medicine', says Chris. 'It is often a lot easier to prevent illness than to cure it.'

In 1987 Chris altered the orientation of *Healthdata*. 'At a time when information on sex education, contraceptives and Aids was changing almost daily, there were no textbooks that could cope with it. Kids were into computers, yet they knew little about their own health.'

Accordingly, *Healthdata* adapted to fit in with the new GCSE Biology course.

By this time, what had started out as a hobby was becoming a national educational database. Chris wanted *Healthdata* to be as widely used as possible and schools were quick to let him know that not all of them were fortunate enough to have modems and that they often had difficulty getting on-line.

So, Chris first bought a new modem and another Beeb. There were now two lines into the database so more callers could log on. As soon as Acorn's Econet Filestore became available 'I was one of the first in the queue to get it' says Chris. 'Filestore offered an affordable networking solution. This, along with the extra line, has made a big difference.

'Before, I had to take *Healthdata* off-line every time I needed to update the information. Now I just use the second micro and the calls can keep coming in.'

To get *Healthdata* to those schools without modems, Chris produced a disc containing a subset of the database – about 400 frames which are updated two or three times a year.

The sales revenue from the discs helps to cover the cost of what is otherwise a very expensive hobby.

Chris now also has an Archimedes and he finds it invaluable. 'The Wimp structure of Risc OS means it's easy to reorganise the database whenever I want'.

The next project for *Healthdata* is much more of a family effort. Sue Dobbing is a pediatric nurse now training to be a primary schoolteacher. Both husband and wife felt there was a need for a primary-specific version of *Healthdata*.

'We're aiming this at children up to the age of nine or 11' says Chris. 'By far the biggest cause of mortality in this age group is accidents. It is important children realise the dangers around the home and on the roads.

This primary section will cover largely the same data as the existing database but it will be written in simpler English and the sex content will not be as detailed. 'The aim is to get children to develop healthy lifestyles as early on in life as possible' says Chris.

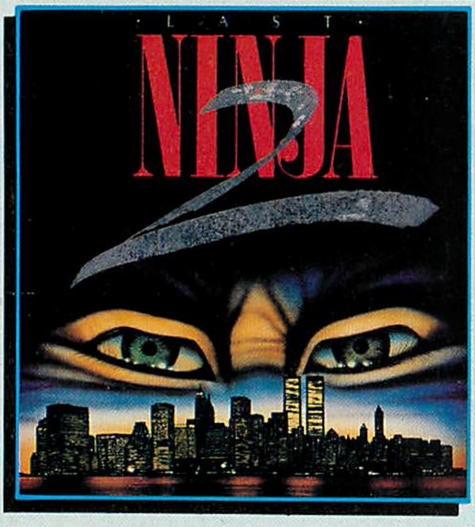
The database is being written by both Chris and Sue. 'To get the whole family involved, the database is being tried and tested on my four children aged from seven to 13. They have three BBC micros and an Arc upstairs. They're all linked to the network, so we're doing our market research on them,' says Chris.

A special primary section has been added to the main on-line database and a separate disc version has been compiled.

Who knows where Chris, his family and *Healthdata* will be at the end of another five years. At the rate *Healthdata* is expanding, Chris and his family could end up living in the garage, while *Healthdata* occupies the house!

You can dial Healthdata *free on 01-986 4360 at 1200/75 baud using the standard Viewdata protocol. The* Healthdata *discs are available from* Healthdata, *21 Vicars Close, London E9 7HT. They cost £12.95 for the 5.25in, 80 track, £14.95 for the 3.5in Compact and Arc versions and £24.95 for the 5.25in Network version.*

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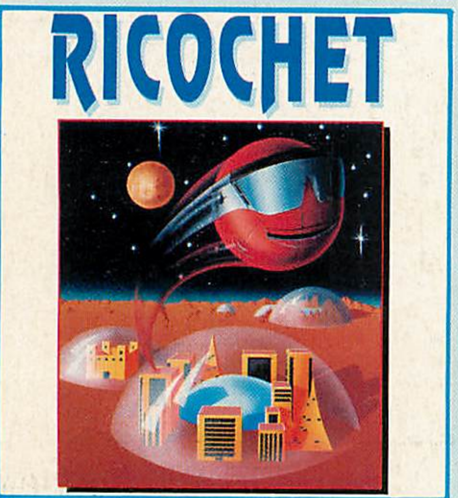
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The Last Ninja


Skirmish






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